A Cross in this space is a reminder that your Subscription to the Journal expires with this number.

ANNUAL RATES OF SUBSCRIPTION.
Farmers, Graziers, Horticulturists, and Schools of Art FREE on prepayment of 1/- to cover postage. Members of Agricultural Societies, 5/-, including postage. General Public, 10/- including postage.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XXXI. 1 MAY, 1929. PART 5.

Event and Comment.

Agricultural and Pastoral Prospects.

OWING to the favourable weather conditions which prevailed during the past quarter throughout those portions of the State where dairying is carried on, the outlook of that industry is very bright. Native pasturage and introduced grasses have made vigorous growth and, in localities where early rain fell, grasses have matured and seeded and late rain has promoted a fresh growth so that the pastures are in an excellent condition for the autumn and winter. Heavy cuttings of lucerne have been obtained, and large quantities have been conserved as hay. Owing to the heavy crops of maize, sorghums, and millets, much of this fodder is available for conservation, and advantage of this has been taken in some districts. The production of butter for the month of February (9,440,200 lb.) constituted a record, exceeding that of January, 1928 (9,293,368 lb.), which was the former peak month in production, by 146,832 lb., while the amount of cheese manufactured in January and February of this year totalled 2,951,667 lb. Dairy stock are in excellent condition and should winter well, as there is every indication of ample supplies of green fodder being available to supplement the natural pasturage. It is expected that the production for the ensuing three months will be above the average for the corresponding period of past years.

The Sugar Crop.

THE first quarter of 1929 was marked by continuous heavy rains in the sugar areas north of Mackay. Exceptionally heavy rains were experienced north of Townsville, and over 100 inches were recorded at the South Johnstone Station, where the crops are reported as being well advanced. The Burdekin area is at present looking exceptionally well, and good rains have precluded the necessity for irrigation. The Bundaberg district received good rains in February, and the crops responded well to the succeeding hot weather. It is rather early yet to give an estimate of the sugar production for the coming season, but general indications are that it should equal the crushing of 1928.

Promise of Good Wheat Crop.

THE widely distributed rainfall, accompanied by other favourable conditions, has been responsible for the present satisfactory outlook for the agriculturist in the Southern division of Queensland, which includes those areas from the Tweed to the Burnett. Owing to the prolific growth of weeds the amount of work involved in the preparation of land for wheatgrowing has been heavy. This, however, should show its effect in the resultant crop and ensure sufficient soil moisture to enable sowing to be carried out expeditiously, and also for the maintenance of the crop during the greater period of its growth. The wheat sown for fodder purposes is well above ground, increased areas of Cleveland and Currawa varieties, which are useful for grazing-off purposes, having been sown in the Pittsworth and surrounding districts. In the Central district, where a very favourable germination is expected, sowing will probably be carried out at an earlier date than is usual on account of conditions of temperature and soil being so favourable.

Maize Ready for Harvesting.

THE maize crop, which in many instances is practically ready for harvesting, will be a heavy one, and provided that early frosts are not experienced on the Downs, the crop from that portion of the State should compare favourably with that of any other single season.

Cotton Being Harvested.

THE harvesting of the cotton crop is now in full swing, and good quality cotton is coming forward to both the Rockhampton and Brisbane ginneries, particularly the former. The picking should cease about the end of July.

Winter Fodders.

REPORTS indicate that considerable areas of winter-growing fodders have been sown, and that in many instances oats sown for grazing-off purposes are now 6 to 9 inches in height. It is anticipated that probably quite a reasonable area of canary seed will be sown for winter fodder, and, if climatic conditions continue favourable, portion of this may later be harvested for grain.

Small Crops.

THE present crop of peanuts gives every indication of being a heavy one, and record yields have been quoted in a few instances. It is anticipated that a considerable increase in the area under peanuts will take place during the present year.

The season has been very favourable to the growth of broom millet in the Central districts, and excellent returns are being secured, while the prices received from the parcels already marketed are very satisfactory.

With the abundance of grass and the very favourable conditions at present existing for the growing of winter green feed, the outlook for the approaching winter is good. With every prospect for a good wheat crop and a satisfactory maize crop awaiting harvesting, optimism is quite justified.

Fruitgrowing.

IN most districts the outlook of the fruitgrowing industry is satisfactory. Bananas continue to do well along the North Coast, and there has been a fair extension in the banana areas in that portion of the State. Excellent bananas are also being produced south of Gympie on the recently-planted lands. In the Central district, particularly in the principal producting area, Byfield, the citrus crop is quite up to the average, and prospects are decidedly encouraging. In the Wide Bay district the quality of the citrus crops is good, and the fruit now being marketed is realising satisfactory prices. The tomato lands are being added to in the Bowen-Townsville area, while Mackay is giving more attention to tomatoes and other small crops.

Graziers' Prospects Bright.

CONSEQUENT upon the advantageous rains and the excellent condition of the herbage generally throughout the stock districts of the State, the outlook for the present quarter is very encouraging. Large numbers of cattle are being travelled to the meatworks, and Southern buyers have been very busy purchasing fat stock in the various districts. The cattle generally throughout the State are in good condition. With the exception of isolated cases of pleuro-pneumonia there have been few outbreaks of disease of any moment. Shearing has commenced in most sheep areas, and from all appearances the outlook for the grazier during the current quarter is bright.

Anzac.

ANZAC Day will remain for all time a fixture in the Australian calendar, and as the years pass the event that it marks is becoming less of a memory and more of a great and glowing tradition. The anniversary of the Epic of Gallipoli was commemorated fitly, amply, and reverently on 25th April in every town and hamlet throughout the Commonwealth; and also in those far countries where, with their comrades of New Zealand, Great Britain, and France, the Australian soldier won lasting fame. It was not the "glory" of war that was extolled, but the service and the sacrifice and all those things that exalt the souls of men in hours of crisis, that the Nation recalled with glowing pride. Those men of our race who, when human liberty was in the balance and the tocsin sounded went forth to fight and did not come home—those men who, in placing on the altar of their country's freedom their great gift of youth and life, became in a moment—

> The living theme of boys unborn for countless centuries,
> Peers of the noblest souls whom God has fired,
> Part of the amplest feat of history—

were remembered, and will be remembered, "while the light lasts, and in the darkness we shall not forget."

Bureau of Sugar Experiment Stations.

CANE PESTS AND DISEASES.

The Bureau of Sugar Experiment Stations has received the following Plant Pathology notes (5th April, 1929) from the Division of Pathology attached to the Bureau:—

For some months the staff of the Division of Pathology has been chiefly engaged in making field surveys in various districts, with the object of determining the best sources of seed cane for the spring planting this year. The area which can be surveyed in this manner is naturally limited on account of the small staff available at present for the work. When such surveys as we are able to undertake are completed, the Bureau will issue lists containing the names of those growers who have cane suitable for seed. Growers who purchase seed from farms mentioned in the lists are reminded that, wherever possible, they should also make a personal selection of the seed they have ordered. It is quite reasonable to expect that occasionally a field will become infected with disease between the time of inspection and the time of cutting the cane for seed. Also, the Bureau officers cannot inspect every single stool of cane in the field, and in the case of Mosaic, for example, when only two or three stools per acre are diseased, it is quite possible that these stools might be missed altogether.

Lower Burdekin.

Downy Mildew or Leaf Stripe is probably the major disease of the Lower Burdekin, on account of the fact that it is responsible for the gradual disappearance of B.208 from the canefields of that area. B.208, when free from disease, produces such remarkable yields of sugar per acre that every effort should be made to save this cane. We think that it is possible to control Downy Mildew in the Burdekin area, where the winter months are so very dry and where practically no ratoons are grown. In attempting control there are two points to be observed:—

(1) Rigid selection of the seed cane, and

(2) The uprooting of any diseased plants as soon as they appear, that is, during the dry winter months.

With reference to seed selection, any cane should be rejected as seed cane if it is within 200 yards of even a single diseased cane. Mr. George Wilson, Assistant Pathologist, has recently spent three months in this district, making a comprehensive survey, and it is expected that his services will be available to the farmers of the Burdekin, for the purposes of seed selection, during April and May.

Farleigh.

A survey of the Farleigh area is nearing completion, and has been carried out by Mr. E. J. F. Wood, Assistant Pathologist. The chief problem in this district is to reduce the amount of Mosaic disease, and a list of farms which are practically free from Mosaic and other major diseases will be published in due ecurse. Farmers who should on no account plant their own seed, will be notified privately. Mr. Wood will be stationed in the Mackay district for some time, and will be prepared to advise farmers on proposed sources of seed. Requests for a visit from Mr. Wood should be addressed to the Sugar Experiment Station, Mackay.

Bauple.

Mosaic has also been a serious problem in the Bauple area, and with the object of assisting the growers to combat this disease, by planting disease-free cane, Mr. N. L. Kelly, Assistant Pathologist, is now making a survey of the district. A list of approved farms will subsequently be published in the usual manner.

Mosaic is the most widespread of all serious diseases of sugar-cane, but in all parts of the world it has been shown that complete control may be obtained by the planting of selected seed, the uprooting of any diseased plants which may appear later, and clean cultivation. Crops such as maize and sorghums should not be grown near cane as they harbour the insect which spreads the disease. Most growers have no doubt read of the great decline of the Louisiana sugar industry, brought about largely by Mosaic disease. At the time of its recognition the disease had become too widespread to be controlled by seed selection. In 1925-26 practically the whole crop

was 100 per cent. infected, and production had fallen to about one-fifth the maximum figure. The situation required drastic measures, and a technologist with very wide powers was appointed. Under his direction a complete change-over is taking place to varieties which are highly resistant to Mosaic, and the result is that in two years the production has been more than doubled. The new Mosaic-resistant varieties which are now being grown are the Java canes P.O.J. 234, P.O.J. 36, and P.O.J. 213. These varieties were introduced into Australia, but have not shown sufficient promise under our conditions to warrant propagation.

North of Townsville.

Top Rot disease has been more common north of Townsville this year. At present our knowledge of this disease is not very extensive, and it is hoped that next year it will be possible for one pathologist to devote full time to the investigation of cause, transmission, and control. Observations on Top Rot in Queensland, and on the very similar Red Stripe in Hawaii, suggest that the most important factor in the control of the disease is the stage of growth of the cane at the commencement of the rainy season. That is to say, a vigorous, well-grown crop is likely to escape the disease. In this connection it is interesting to note that although the past year was extremely dry in the Burdekin district, yet on account of more frequent and more regular irrigations it was generally agreed that the 1928 plant cane was better grown than the crops in most years of normal rainfall. At the same time our surveys show that the amount of Top Rot is much below average this year.

It is also thought that early fertilisation may play a big part in the control of this disease, and the fertiliser experiments now being laid out on representative farms, by officers of the Bureau, will help to test out this theory.

Bundaberg.

During the past six months an exhaustive survey has been made of farms in the Bundaberg district, with the object of finding what quantity of disease-free seed is available. We have now a list of some forty odd more or less isolated farms on which we have found no trace of gumming in the cane on each of three inspections. These farms will be inspected once or twice more before July, and a list of those considered safe sources of seed cane will be published.

A number of properties have been inspected as a result of their being offered as sites for the propagation of disease-free cane, and the pathologist will visit Bundaberg next month for the purpose of making a selection of these.

According to the Annual Report of the Mauritius Department of Agriculture for 1927, gumming disease is on the increase. A detailed survey showed that the disease was causing severe damage in the variety White Tanna, which constituted 56 per cent. of the total crop. The crop was about 15 per cent. below estimate, and this was stated to be due mainly to the ravages of gumming diseases.

In September, 1928, sixty-seven varieties of cane were imported from Hawaii in our endeavour to find gum-resistant canes. These varieties were held up for some weeks on account of the waterside trouble, but nevertheless some sixty varieties were germinated, and are now growing in quarantine. No canes will be liberated unless they prove to be disease-resistant.

The necessity for the quarantining of introduced varieties is emphasised by the fact that both Mosaic and Fiji diseases were reintroduced in the Brandes collection of New Guinea canes, which are growing in Sydney.

CANE PEST COMBAT AND CONTROL.

The following report for the period March to April has been received by the Bureau of Sugar Experiment Stations from Mr. E. Jarvis, Entomologist, at Meringa, North Queensland:—

"When will you growers fight that Beetle pest
The Weevil-borer? Please don't let it rest."

Some of you may ask the question—"But *when* and *how* should it be tackled?" In reply let me say that now, right away, is a good time in which to start a campaign against this serious cane borer. Every farmer can, if he wishes, carry out an interesting experiment to discover whether this insect has become established, or is trying to gain a footing, on his cane land. Just continue reading, and you shall learn how to do it.

Take about half a dozen thick juicy cane sticks, cut them into lengths of from 10 to 12 inches, and split each in half lengthwise with a cane knife. Now, lay these cut pieces on the ground side by side, touching each other, under a stool at the edge of a block of standing cane, and in a position affording shelter from direct sunlight. Arrange the sticks with the cut surfaces downwards, in the form of a little heap about 9 inches wide by 6 in height, and cover this over with a layer of moist trash about 3 inches thick, in order to prevent the bait-trap from drying too quickly, and secure damp, darkened, conditions. Examine this trap every second day to note the percentage of weevil borers attracted to same, which, when present, will be found under and amongst the cut sticks.

The Trapping of Beetle Borers Meets with Success.

The Chemist in Charge at the South Johnstone Sugar Experiment Station is having great success with this method of trapping beetle borers, and recently sent over 400 living specimens of this weevil to Meringa Experiment Station, to be used for breeding purposes in connection with the propagation of one of the most useful parasites of this notorious cane borer.

Growers should be able to get results similar to those mentioned above.

If ten to fifteen beetles are found in a single bait trap it will pay to lay down a dozen or more at distances of a few chains apart, in areas which may be thought likely—from previous experience—to harbour beetle borers, such as low-lying cane lands, or fields on which the cane has been partly blown over.

Scattered Cane Blocks are a Mistake.

When adding to your acreage of cane, the position of additional blocks should always be arranged as far as possible to form a direct continuation of the main existing plantation. By following out this plan the total length of headlands adjoining forest country can be reduced to a minimum, and less injury incurred from possible invasion of a cane farm from the outside by various sap-sucking and leaf-eating insects, such as grasshoppers, moth borers, leaf hoppers, &c.

Destroy the Bread Ravager of Canefields.

Our old enemy the "greyback" cockchafer is much in evidence just now on many cane areas, where, during seasons like the present, the sight of the extensive damage caused by its grubs must be very disheartening to those concerned.

What are you growers going to do about it? Leaving things to chance is poor policy, as the present situation calls for drastic action. Your wisest course is to make provision for combating the grubs of this pest next season.

Those intending to fumigate their cane should get into touch at once with the Entomologist at Meringa, in order that arrangements can be made in good time with the secretary of the Cairns Cane Growers' Association for the purchase of any fumigants required.

Farmers wishing to use paradichlor. will be able to purchase it at the price quoted last season—viz., £55 per ton.

Those favouring the carbon bisulphide treatment can procure this fumigant for about 38s. 6d. per drum holding 60 lb.

Destroy all Weeds Whenever Seen
It pays to Keep your Cane Land Clean.

It is necessary to impress upon growers the importance of clean cultural conditions. Never allow weeds to attain any size or to go to seed between the rows of cane, as in addition to the loss of a certain percentage of natural plant-food, and of manures that may have been applied to the soil, the mere presence of a bed of weeds serves to attract the attention of several minor cane pests, together with a variety of insects, which, after visiting the weeds and grasses, will naturally settle upon the cane, and may in time come to acquire a liking for the young heart-leaves.

The large moth borer, for instance, frequently invades such neglected plantations, the caterpillars of this pest having often been noticed destroying young shoots of plant and ratoon cane of the borders of blocks adjoining virgin forest country, and close to headlands left covered with blady grass and other weeds.

Furthermore, during the flighting or swarming period of our greyback cockchafer, a vigorous growth of vegetation between the cane rows will often induce the female beetles to deposit their eggs in such places.

FUNGI AND BACTERIA.*

By J. H. SIMMONDS, M.Sc., Plant Pathologist.

A plant may be said to be diseased when, owing to some condition of its environment or due to the presence of some associated organism, it is not able to display its normal state of development. In its widest sense the term "disease" would include the results of insect depredation, but it more commonly serves to designate plant troubles of the undermentioned types. The study of diseased conditions of this nature comes within the realm of Plant Pathology and is the work of the Plant Pathologist.

1. *Non-Parasitic or Physiological Diseases.*—These include general or local disturbances of the normal physiology of the plant owing to unsuitable environmental conditions, such as poor drainage, soil deficiencies, &c. The nature of these diseases is often obscure and in many cases the actual cause is unknown. Examples will be found in blossom-end rot of tomatoes and citrus exanthema.

2. *Parasitic Diseases.*—In this class are included diseases due to attack by members of several groups of parasitic organisms of which by far the most important are the fungi and bacteria. The great majority of diseases manifesting themselves in the form of definite lesions, such as leaf spots, fruit rots, &c., are caused by the presence of species from one or the other of these two groups.

3. *Virus Diseases.*—These are due to the presence within the plant of an infectious principle of ultra-microscopic size. Although little can be ascertained regarding the nature of the causal agent in these diseases, the members as a whole exhibit relationships which suggest that the group is a natural one. There are two well-known representatives in Queensland—bunchy top of bananas and spotted wilt of tomatoes.

FUNGI.

To understand fully the nature of a fungus or bacterial disease it is necessary to have some realisation of what the causal organisms are like in their structure and habits.

The fungi are low down in the scale of the plant kingdom. Their nearest allies are the algæ, some of which constitute the simplest forms of plant life known, while the higher forms are represented by the seaweeds. In both algæ and fungi the vegetative state takes the form essentially of a slender tubular filament or by association of several filaments a tubular structure or flat plate may be formed. The external appearance may differ widely in the various species, which sometimes superficially resemble the shape of higher plants. Growth, however, can normally take place from the ends of the filaments only and the solid structure of the higher plants with all their specialised organisation depending on cell division both parallel and at right angles to the direction of growth never occurs.

Some fungi closely resemble the algæ in both vegetative and reproductive characters and they have probably evolved from the latter

* Reprinted from "Pests and Diseases of Queensland Fruits and Vegetables," by Robert Veitch, B.Sc., F.E.S., and J. H. Simmonds, M.Sc., published by the Department of Agriculture and Stock, Brisbane.

group. One very important point of separation from the algæ, and higher green plants as well, is the fact that a fungus does not possess the green colouring known as chlorophyll. By the aid of this substance plants which possess it are able to build up out of the carbon dioxide of the air and water and salts from the soil all the material necessary for their growth. Since a fungus does not possess chlorophyll it is dependent for nourishment on material already elaborated by green plants, such as is to be found in dead and decaying organic matter or in the living substance of the plant itself.

Structure.

The vegetative part of a fungus is known as mycelium, and consists of slender cylindrical thread-like filaments. (Plate 93, fig. 1A.) These are very fine and delicate, their diameter being usually somewhere in the region of $\frac{1}{5000}$ of an inch. A single thread of mycelium is known as a *hypha*. The cavity of the filament may be continuous, as, e.g., in some of the moulds, but in all the higher fungi it is divided by partitions or *septa* into a number of cells. The mycelium is composed on the outside of a thin pliable membrane which is a product of secretion of the living substance within. It is formed of a material differing somewhat from the ordinary cellulose of plant cell walls and in many cases consists rather of *chitin*—the substance going to form the shell of insects. Within the cell wall and lining it is the actual living matter of the organism. This is known as *protoplasm* and consists of a clear jelly-like substance. There is usually in each cell a small area of very highly differentiated protoplasm enclosed in a delicate membrane of its own. This body, known as the *nucleus,* is the all-important organ of the cell and controls the various growth and life manifestations of the fungus, such as assimilation and reproduction.

In a young cell the whole of the interior is filled with protoplasm, but as the cell wall expands and elongates with growth spaces known as *vacuoles* are left which become filled with watery cell sap. Reserve food material is often present in the cell usually in the form of granules of glycogen or animal starch and bright refractive globules of oil. Some fungi have colouring matter permeating the cell wall or dissolved in the oil globules. Growth of a hypha is a simple process. The terminal cell elongates. The nucleus divides and a transverse septum is laid down separating off the daughter nucleus and thus forming two cells. The new apical cell then enlarges and continues the growth as before. Branching takes place by means of a lateral extension from a cell of the hypha which takes on the function of a growing tip.

The form assumed by most of the less highly differentiated fungi in their vegetative state consists simply of a more or less interlaced mass of mycelial threads. Many of the higher forms by aggregation of hyphæ in a definite manner have produced more complex fungus bodies. The simplest of these is formed from the close interweaving, and in some cases fusion, of numbers of the hyphæ running together in a longitudinal direction. Definite fungal strands visible to the naked eye and known as *rhizomorphs* are thus produced. Sometimes the rhizomorph is differentiated into an outer thick-walled protective layer and an inner region of more delicate structure. A good example is seen in the black strands enveloping the roots of trees attacked by *Armillaria mellea.* The white strands given off from the base of mushrooms and

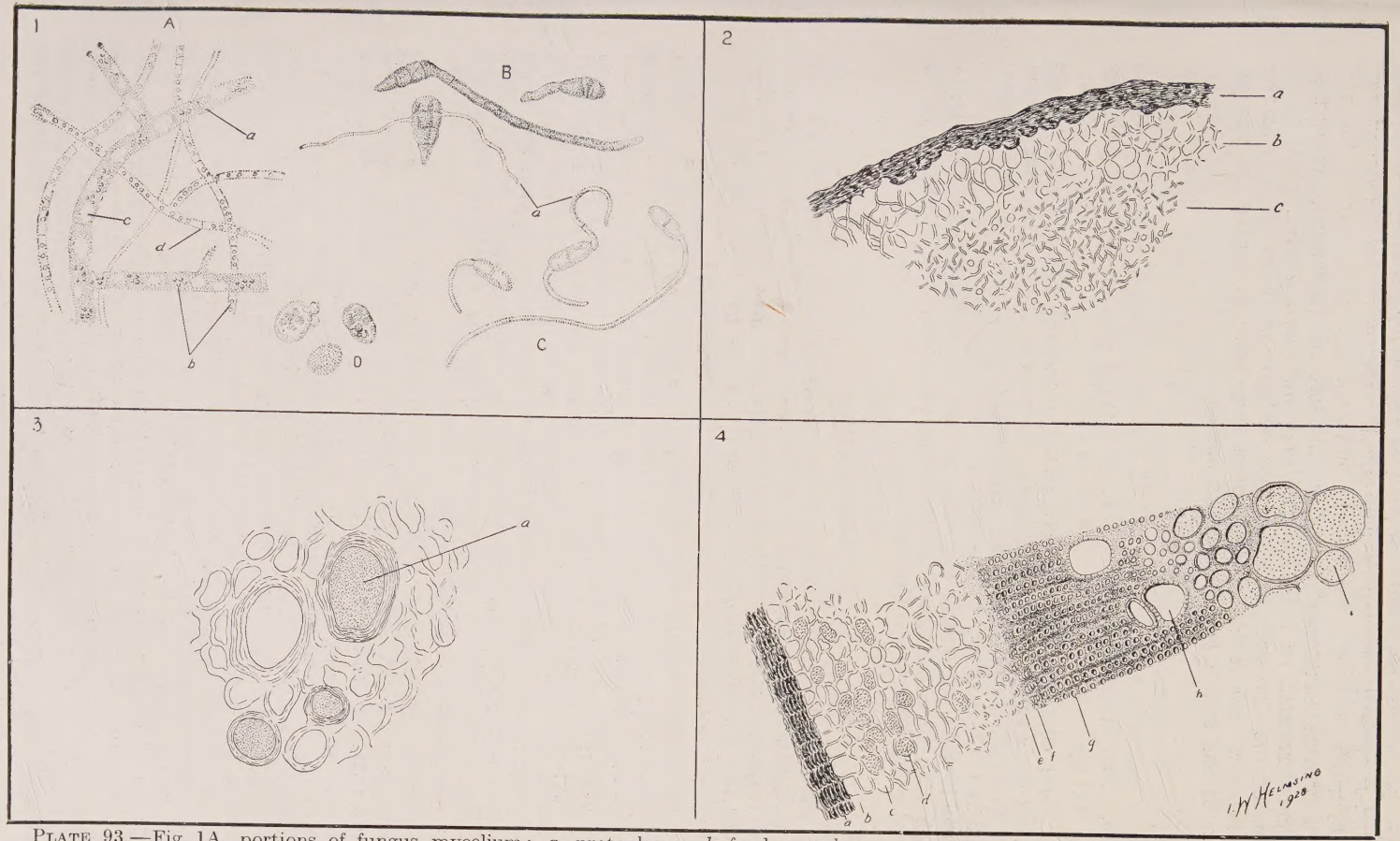


PLATE 93.—Fig. 1A, portions of fungus mycelium; *a*, protoplasm; *b*, food granules; *c*, vacuoles; *d*, septum. B and C, germinating spores; *a*, germ tubes. D, Zoospore formation in *Plasmopara viticola*. Fig. 2, segment of transverse section through a sclerotium of *Sclerotium rolfsii*; *a*, hard outer cortex; *b*, pseudoparenchyma; *c*, medulla, x 210. Fig, 3, portion of transverse section of cabbage stem showing Black Rot bacteria (*Ps. campestris*) in vessel at *a*, x 210. Fig. 4, segment of transverse section of persimmon shoot; *a*, cork; *b*, phellogen; *c*, parenchyma cells of cortex; *d*, starch grains; *e*, phloem region; *f*, cambium; *g*, xylem cells of wood; *h*, larger xylem vessel; *i*, parenchyma cells of pith, x 210.

commonly known as spawn are of a similar type. By means of these organs a fungus can travel with its delicate tissues undamaged for a considerable distance through the soil.

The mycelial aggregate may take a more compact form, giving rise to firm irregular or spherical bodies known as *sclerotia.* These, by virtue of the development of a thick resistant wall to the cells of the outer layers, can act as resting bodies and serve to enable the fungus to withstand such adverse conditions as exposure to drying. (Plate 93, fig. 2.) Reserve food material is frequently stored up within their cells. Examples of sclerotia are seen in the black irregular disc-like bodies scattered over the tubers of potatoes affected with Rhizoctonia Scab. The rounded form is fully described for the sclerotial fungus included under the heading of Mycelia Sterilia.

More complex still are the structures developed by many fungi during their reproductive stage—e.g., such as are seen in the mushroom and bracket fungi. Here by interlacing and fusion of the hyphal filaments there may be formed a many-layered cellular structure resembling in superficial appearance that found in the higher plants. Such structure is known as *pseudoparenchyma.* It is shown in its simpler development in Plate 93, fig. 2.

Reproduction.

So much for the mycelium by means of which a fungus grows over or within its host and attains food and nourishment for its development. The vegetative stage in most fungi serves as a means to one end—that being the development of a reproductive stage by means of which the organism is perpetuated from generation to generation.

In a few, reproduction takes place simply by means of broken segments of mycelium; in the majority, however, there is developed a special reproductive organ consisting of a single cell or at most a small cell aggregate known as the *spore* which corresponds in function to the seed of higher plants. Should a mature spore reach the right food material, and the temperature and moisture be suitable for development, its living contents will grow out into a slender delicate hyphal structure known as a *germ-tube,* which represents the first stage in mycelium development. With it commences once more the vegetative stage of a new fungus plant. (Plate 93, figs. 1 b, c.)

Spores are formed from the mycelium in two main ways—(1) *Endogenously*: In this case the contents of the modified mother cell known as a *sporangium,* become divided up into a number of smaller portions which may or may not develop cell walls of their own. These are finally liberated by rupture of the sporangium wall (Plate 95, fig. 1). In some cases, as e.g., in the fungus causing Irish Blight, the spores develop a fine filiform vibratile process known as *flagellum* which enables them to swim around in a film of surface moisture. Such spores are called *zoospores.* (2) *Exogenously:* Exogenous spores are produced from the ends of fertile hyphæ by a process analogous to budding. The top of the hypha becomes separated off by development of a septum, and the cell so formed gradually assumes the shape of the particular spore form of the species. Often the hypha is divided into a number of segments before shedding of the spores takes place, so that a chain of spores is produced. Spores produced in an exogenous manner are called *conidia* and the fertile hyphæ from which they are developed are known as *conidiophores.* (Plate 95, figs. 8, 9, 3b.)

Many fungi are *polymorphic*—i.e., they develop more than one spore form during their life cycle. (Plate 95, figs. 3, 5.) Commonly in one of these forms is represented a sexual stage. In the fungi this consists essentially in the union of the nuclei of two distinct cells either from the same or different fungal plants. The significance of this act is doubtful, though in some cases it may serve to invigorate the stock and preserve the characters of the race. The fruiting body developed in connection with the spores resulting from this act of union is usually referred to as the *perfect stage* of the fungus. Other methods of spore formation occurring in conjunction with a sexual stage are usually various modifications of the exogenous or endogenous types mentioned above. In the case of the occurrence of the former type the stage is usually referred to as the *conidial stage.*

The actual details of spore formation and the various supporting structures developed in connection with the process vary greatly in the different groups into which the fungi are divided, the groups themselves being largely established on consideration of the reproductive characters.

A description of some of the more characteristic types will be found in the chapter dealing with the classification of fungi.

BACTERIA.

The bacteria rank next in importance to the fungi as causal agents of plant diseases. At one time they were considered to be parasites only of animals—a view since shown to be quite erroneous by the discovery of members of this group acting as the causal agents in many serious plant troubles. The bacteria are usually attached to the true fungi or Eumycetes as a separate division known as the Schizomycetes or fission-fungi. They resemble fungi to a large extent in their general habits, though differing from them morphologically, being of simpler construction.

Bacteria appear as sphærical or rod-shaped cells of extremely minute size. A quite average specimen might have a diameter of less than $\frac{1}{25000}$ of an inch. (Plate 93, fig. 3a.) The cell is bounded by a thin elastic outer wall or capsule within which lies the living protoplasm. From the wall of the capsule may extend one or more vibratile filaments known as *flagella,* which confer the power of motion on the species possessing them. The flagella may be polar or diffusely scattered. As in the case of fungi, there is no chlorophyll developed. Numerous granules may be imbedded in the protoplasm, but a definite nucleus such as is found in the fungi and all the higher plants appears to be absent.

One of the chief differences between the fungi and bacteria is in their manner of growth and reproduction. In the former growth is continuous from the apex of a hypha and reproduction takes place by the use of a specialised spore. The bacterial cell has no apical growth. A slight extension takes place and then the individual divides into two by simple fission. The two cells may separate and become independent, or they may remain more or less loosely associated end to end when by frequent division of each cell a chain of individuals is formed. Successive division may take place after intervals of half to one hour. At this rate the progeny of a single cell may in twenty-four hours amount to many millions. Fortunately, lack of suitable food material or environment and the toxic action of their own secretion helps to keep the

number down. A resting spore is formed by some bacteria. A portion of the protoplasm in a mother cell becomes somewhat denser, and round this is developed a special wall to form the spore. This appears as an ovoid refractive body lying within the mother cell. These spores are highly resistant to adverse conditions and can germinate readily after being subject to conditions fatal to the ordinary vegetative cell.

Most of the plant pathogens belong to the rod-shaped type. Of these the chief genera are *Bacterium*—non-flagellate; *Bacillus*—flagellate with flagella diffusely scattered; *Pseudomonas*—flagellate with polar flagella.

MYXOMYCETES.

This primitive group of slime fungi are often associated with the Eumycetes and Schizomycetes as a third division, the Myxomycetes, under the term Fungi, using this name in a broad sense. The three divisions resemble each other in the absence of chlorophyll and certain characters resulting from this. The slime moulds constitute the lowest form of plant life, living as they do on the border line between plants and animals. They are unprotected in their vegetative state by a cell wall, and consist of a naked mass of jelly-like protoplasm. Most forms are saprophytes. One is the cause of the well-known Club Root of cabbage. None of the slime moulds are responsible for serious disease in this State.

HABITS OF FUNGI AND BACTERIA WITH SPECIAL REFERENCE TO THE HOST PLANT.

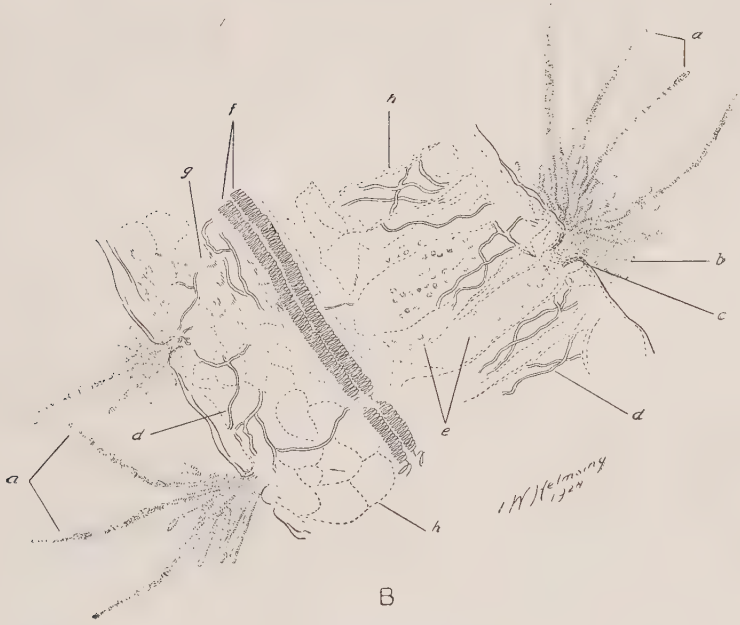
To understand the effects a fungus may have on its host it is necessary to form some idea on the general structure of the flowering plants. It is therefore proposed to give here a brief outline of this subject.

Structure of the Host Plant.

On general appearance a plant is at once seen to consist of roots, stem, and leaves, and with each of these is associated differences in structure and function. The roots serve to anchor the plant to its substratum and act as the absorbing organs for obtaining the water and mineral salts necessary for nourishment and for maintaining turgidity. If there is not sufficient water available to fill and distend the cells and thus confer a state of rigidity even on soft tissue, sagging and wilting will occur. The trunk and branches serve for support and display of the leaves and provide channels of communication between these organs and the roots. The leaves are the site of the elaboration of the various food constituents for which they serve as the receiving depôt. By means of the complex green colouring matter known as *chlorophyll* which is present in them, leaves are able to make use of the sun's light energy and by its aid absorb the carbon dioxide from the air and combine it with the water and mineral salts obtained from the soil by the roots. The first products of this chemical action are simple, but there is finally built up from these all the complex organic compounds which go to make up specialised plant structure.

The whole of the plant body, like that of the animal, is composed of a collection of minute cells. A plant cell differs from that of an animal in that it is provided with a wall of cellulose to which the rigidity of the plant structure is due. The individual cells are box-like or oblong

A



B

PLATE 94.

Fig. A.—The ectoparasitic type of fungus. *Oidium erysiphoides* as it appears on the surface of a marrow leaf infected with Powdery Mildew, x 210.

Fig. B.—The endoparasitic type. Section of leaf of the nightshade (*Solanum nigrum*) attacked by the fungus *Cercospora solanacea* ; *a*, spores ; *b*, conidiophores ; *c*, stomata of the leaf ; *d*, mycelium of the fungus ; *e*, chloroplasts in cells not yet invaded ; *f*, conducting vessels of vascular bundle ; *g*, tissue disintegrating as result of fungus attack ; *h*, cell walls, x 210.

and in general resemble the fungal cells described above. The cells of the leaf and other green parts contain embedded in the protoplasm, in addition to the nucleus and various food granules, small disk-like bodies known as *chloroplasts*. (Plate 94B.) These contain a fatty substance in which is dissolved green colouring matter—chlorophyll—on which as it has been shown the life processes of the plant depend. The higher plants differ from the fungi and algæ in that their cells have the power of dividing by walls parallel as well as at right angles to the direction of growth so that more solid structures can be produced. Young tissue consists of a mass of closely packed oblong cells, but as these distend somewhat with growth the walls separate slightly at the edges and minute intercellular spaces appear. It is by means of these spaces that the air reaches throughout the tissue, bringing with it the oxygen used in respiration. Should air be prevented access to any part such as by waterlogging of roots, &c., asphyxiation is likely to occur. In the plant there is nothing corresponding to the complex blood system of the animal which distributes throughout the whole body the oxygen on which life depends. Thus every cell of the plant must come in contact with air and breathe for itself.

The outer surface of a plant, at least in its young stages, is covered by a protective layer of cells known as the *epidermis*. This consists of a single layer of closely united cells whose outer wall is thickened by the deposition of corky or waxy substances which serve to prevent excessive loss of moisture and also protect the plant from invasion by parasitic organisms. At frequent intervals, especially on the under surface of leaves, minute funnel-like pores or *stomata* occur in the epidermis of the aerial parts through which air circulates to the inner tissue. (Plate 94B.) The stomata are rather a point of weakness in times of fungal or bacterial attack, as organisms unable to penetrate the protective epidermis are often able to gain entrance by their means. On the young fibrous roots very thin-walled tubular extensions of the epidermal cells act as the absorbing organs through which the desired soil solutions percolate. They are known as the *root hairs*. The delicate nature of these is sometimes made use of by soil-frequenting parasites which find in them an easy path to the inner tissues of the root. Developments from the epidermal cells of aerial parts may result in producing hairs, scales, &c.

In the branch and root of woody plants the epidermis later becomes replaced by a more substantial protective covering. A ring of cells lying just below the epidermis takes on the power of active division and is known as the *phellogen*. These cells divide by walls laid down parallel to the external surface and form a layer of closely-fitting oblong cells built up somewhat like bricks in a wall. The cells of this layer become impregnated with a corky material which with their tightly packed arrangement makes them specially suitable to resist adverse conditions of the environment and the attack of parasites. (Plate 93, figs. 4 a, b.) It is this layer, known as the cork, which makes many of the fungi attacking woody tissues dependent on wounds for their entrance. The cork, together with some of the underlying tissue, is that part of a tree to which the common name of bark is applied. After cork formation the place of the stomata is taken by patches of loosely packed cork cells through which the air is able to penetrate. Apart from the bark phellogen it is not usually normal for mature cells to take on the function of active division. However, this does occur in the case of wounds or

an invasion by parasites. A layer of contiguous cells surrounding the affected region assumes the function of a phellogen and deposits a protective layer of cork which cuts off the injured from the healthy tissue. The lesions of many fungi are definitely restricted in extent by a deposition of cork in front of their line of advance.

The radial growth of the stem and roots of the larger plants is due to the action of a ring of actively dividing cells having its origin in the growing point and extending back in the shape of a thin hollow cylinder situated some distance further in than the phellogen layer. This tissue in which active cell multiplication takes place is known as the *cambium*. From it are cut off on the side towards the centre of the stem cells which eventually become large cylindrical vessels, the walls of which become thickened and strengthened by a substance known as *lignin*. These cells in mass form what is commonly known as the wood and botanically as *xylem*. (Plate 93, fig. 4 e, f, g, h.) Besides lending support to soft tissue the xylem vessels serve as conducting tubes which convey water and dissolved salts from the roots to be used in the leaves. On the outer side of the cambium, cells divide to form a smaller number of narrow elongated cells known as *phloem* tubes, through which the food material elaborated in the leaves is conducted to other parts of the plant needing it. In some annuals and young plants the cambium may not be developed in a complete ring, in which case smaller patches of xylem vessels, cambium, and phloem, known as *vascular bundles*, form isolated woody strands running down the branch. Surrounding these and separating them from each other is a loose tissue composed of round or oblong thin-walled cells known as *parenchyma*. Parenchyma separates the phellogen and cork from the vascular tissue, and when present in the centre of the stem forms the pith. (Plate 93, fig. 4 c, i.) In the leaf, extensions of the vascular bundles of the branch form the veins. (Plate 94B, f.) Here the interlying parenchyma is particularly loose in arrangement so as to facilitate circulation of air amongst the chlorophyll containing cells and thus permit of ready assimilation.

Anyone wishing to go further into the subject of plant structure and physiology should provide themselves with "An Elementary Text-book of Forest Botany," by C. T. White, F.L.S.

Saprophytes and Parasites.

As mentioned elsewhere, one of the essential points of difference between the fungi and bacteria and the rest of the plant kingdom is the normal absence of chlorophyll. As this green pigment is a chemical necessary for the manufacture of the carbon compounds out of which is built the great bulk of the structure of plant life, it follows that the fungi and other forms lacking chlorophyll have to fall back on the higher green plants or organic products derived from these for their supply of carbonaceous material. A little thought will show that the animal kingdom is also ultimately dependent on green plants for its food supply.

With reference to their method of obtaining a supply of organic food, the fungi and bacteria can be divided into two main groups.

(1) *Saprophytes.*—Under this term are included all the multitude of organisms that live on dead plant remains. These they break down into carbon dioxide, ammonia, and simple mineral salts suitable for absorption again by the roots of green plants, assimilating at the same

time substances suitable for their own nourishment. The saprophytes act as scavengers, and play a very important part in the economy of nature by preventing the excessive accumulation of waste material, which they place in a condition suitable for use again.

(2) *Parasites.*—As parasites are included all those organisms which are able to attack and obtain their nourishment at the expense of living plants and animals. This group includes all those fungi and bacteria causing definite plant disease.

The two groups are not clear cut. Sometimes an organism normally a saprophyte may invade and produce disease in a plant whose vitality is low on account of subjection to poor growing conditions or other detrimental agencies. These are known as *hemi-saprophytes,* as distinct from *true saprophytes,* which cannot attack a living host. Examples are seen in certain root rot producing organisms. Others, although capable of true parasitism, are able to live for a time on decomposing organic matter in the soil, and from there pass to a living plant should it come in contact with a suitable host. Organisms of this nature are known as *hemi-parasites.* Many species of *Fusarium* and *Rhizoctonia* causing crown and root trouble are of this type. The rusts and smuts are examples of the *true parasites* depending entirely on a living plant for their support.

Some weak parasites are only able to enter their host by means of wounds which rupture the normally resistant bark and expose the more delicate living tissue below. Some may even start as saprophytes on the dead tissue of the wound, and from there pass into the healthy region. Examples of these types may be had from the fungi responsible for collar rot in citrus, and in many of the organisms attacking the woody parts of plants.

Some fungal parasites choose a member of the animal kingdom for their host. A few of these are parasitic on man and the higher animals. Others serve a useful purpose, since they attack and destroy many of the scale and other insect pests, over which in a wet season they may exercise considerable control. The fruiting stage of these *entomogenous* fungi can be seen as a white or reddish tuft protruding out from beneath the covering of the dead scale.

Ectoparasites and Endoparasites.

The parasitic fungi can be divided into two groups with respect to their method of living on their host. These are the *ectoparasites* and *endoparasites,* a grouping which is of considerable importance when control measures are being considered.

Ectoparasites are those fungi whose mycelial growth is out on the external surface of their host plant, where it forms patches of fine web-like covering. (Plate 94, fig. A.) From the hyphæ in contact with the epidermal cells short lateral peg-like branches are given off which penetrate the cells of the outer tissue layers, and from them absorb all necessary nourishment. The absorbing organs are known as *haustoria.* The Erysiphaceæ or powdery mildews are a large group of important plant parasites whose habits are of an ectoparasitic nature. This enables them to be effectively controlled by application of sulphur and sulphur compounds in the form of a dust or wet spray. Certain of the fumes given off by the sulphur cause the death of the superficial fungus mycelium without injuring the plant.

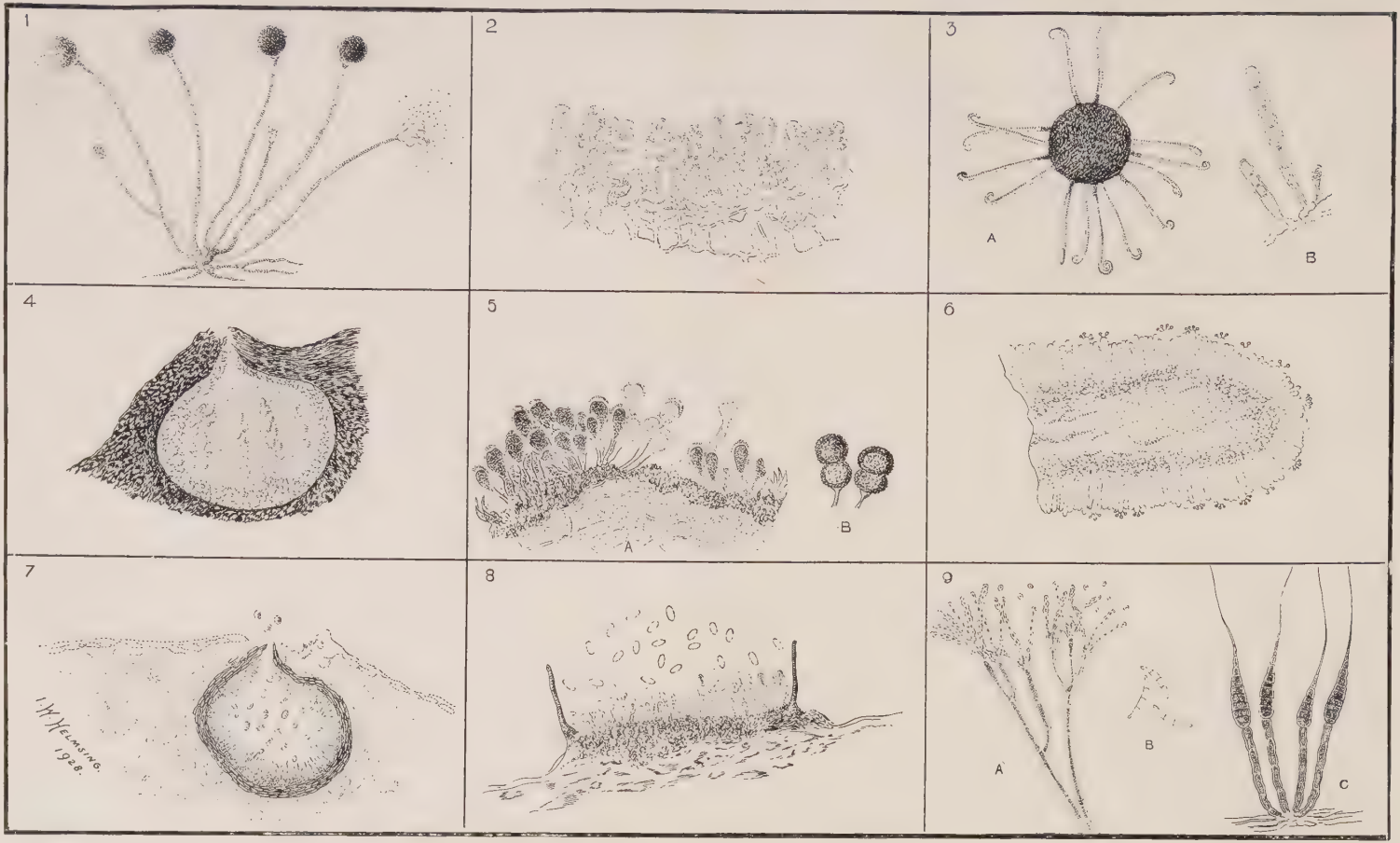


PLATE 95.—FRUITING BODIES OF SOME TYPICAL FUNGI.

1. *Rhizopus nigricans*. 2. Asci of *Taphrina deformans* on surface of curled peach leaf. 3. *Uncinula australiana*—A, perithecium ; B, conidial stage. 4. Perithecium and asci of *Glomerella cingulata*. 5. *Puccinia prunispinosæ*—A, uredosorus on peach leaf ; B, teleutospores. 6. Section through the gill of a mushroom. 7. Section through orange rind showing pycnidium of *Phoma citricarpa*. 8. Section through acervulus of *Gloeosporium lindemuthianum* on French bean. 9. A, *Penicillium expansum*; B, *Fusarium* spores ; C, *Alternaria solani*. (Figures x 210.)

In *endoparasites* the spore on germination grows out into a delicate hyphal thread known as the germ-tube, which penetrates the epidermal layer by dissolving the outer cell wall, or, when not able to do this, by making its way through the stomata or breathing pore. The hypha then branches, and the mycelium spreads throughout the tissue of its host, either growing in an intercellular manner between the cell walls and sending short haustorial branches into the individual cells for food supply, or else itself penetrating both intercellular and cellular spaces in its ramifying passage through the host tissue. The final result is usually death of the tissue in the part invaded. (Plate 94, fig. B.) The dissolving of the epidermal wall by the germ-tube and the subsequent penetration of the mycelium through the cell walls of the inner tissue is accomplished by means of an enzyme secreted by the protoplasm of the growing tip, which has the power of dissolving cellulose. Some fungi and bacteria secrete a toxic substance which kills the host cells for some little distance in advance of actual hyphal growth. This in a few instances may be of a distinct advantage to the plant, as the fungus is unable to obtain the living tissue required and dies. There are parasites, such as some of the smuts and rusts, which have reached a high degree of adaptation with their host, and no actual death of the tissue or *necrosis* as it is called takes place, although the mycelium may be present throughout the cells.

When once the fungus mycelium has penetrated within the tissue of its host it becomes more or less protected from the effects of external fungicidal applications. As the plant possesses nothing corresponding to the blood system of animals whereby a poison may be carried uniformly throughout the organism, it is necessary to fall back on a spray, which, when covering the surface of the susceptible host, will kill the germ tube before it can gain entrance to the interior. For endoparasites a spray such a s Bordeaux or Burgundy mixture therefore becomes necessary.

Effect—the Parasite and the Plant.

The reaction between the host and parasite is usually specific for the fungus or bacterium attacking and the host species attacked. There are thus formed characteristic types of injury for each disease. Much often depends on the ability which the host displays in the development of a protective corky layer around the affected region, the lesion by this means being limited to areas of definite size.

Leaf infection usually results in spots of various size, shape, and colour. The plant may cut off the affected part by a corky layer, when the centre may drop out, leaving a shot-hole condition. The attack of woody parts may result in the formation of open wounds or cankers or extensive dry rot. When juicy fruit or succulent tissue is attacked a soft rot is commonly the result, especially when bacteria are the causative agents. The attack of a soil-frequenting organism may result in root or collar rot, or the water-conducting tissue may be invaded. In this case a wilting or gradual declining of the aerial portion of the plant is often the first symptom noted. When the leaves commence to die more or less uniformly from the margin, root trouble can usually be looked for—the region furthest from the source of water supply feeling the effect first. The fungus does not always kill the tissue of the host, but may stimulate its abnormal development. This occurs in the production of such malformations as peach-leaf curl, witches' brooms, fungus and bacterial galls, &c. Abnormalities also occur as a result of restriction in normal growth.

BANANA EXPERIMENT STATIONS.

KIN KIN.

The following progress report of the work done at the Kin Kin East Experimental Farm has been received from the Acting Manager, Mr. H. J. Freeman:—

Preparations for Planting.

The desired site of approximately 15 acres was chosen for the conducting of different experiments in connection with banana growing at Kin Kin East, and clearing was carried out satisfactorily. Favourable weather conditions continued and the fallen scrub dried quickly. On 16th November the scrub was fired and resulted in a reasonably good burn. Owing to the position of the banana plantation on the adjoining property and the prevailing wind, the fire could not be lighted as soon as desirable, and the logging-up and burning-off was commenced on 21st November. Preparations for planting were commenced at the lower end of the area and the different plots were separated by good margins. Realising the necessity on an experimental farm for a plot of land available for planting at short notice, an area of approximately 3½ acres along the western boundary of the clearing was reserved and planted with a cover crop of beans (velvet and soya varieties). It would be quite possible to convert this land into a cultivated experimental plot at very short notice, whereas, if scrub had to be felled, months would elapse before such ground would be ready for planting.

Altogether 4,820 bananas have been planted and these include six varieties. Satisfactory growth has been made since planting, especially in the case of the Gros Michel variety.

Experiments Conducted.

Experiments in steeping (dipping in different solutions for given periods), spacing, depth of planting, trimming, and fertilising have been conducted and baiting beetle borers has also received attention.

Slide tracks have been made and a carrying wire and windlass system have been erected. The building area has been securely fenced and preparations have been made for the fencing off of the whole cleared area. Excessive rain caused serious delay, and created a heavy weed growth, but the property throughout has been kept clean by several chippings. An experiment with weed-killing spray was also carried out on a small area of land.

BARTLE FRERE.

The following report on the work performed at the Experimental Farm, Bartle Frere, has been received from Mr. W. J. Ross, Assistant Instructor in Fruit Culture, Cairns:—

Weather.

For the quarter ended 31st March the rainfall at Cairns was 84.67 inches and although no records are available for Bartle Frere, it is thought that the rainfall there was a little heavier. The excessively wet conditions did not help to expedite the work on the Experimental Station, and it was fortunate that a "burn-off" of the felled area had been previously effected.

Fencing.

A four-wire—2 barb, 2 plain—fence with a gateway in the centre has been erected along the front boundary of the recently felled and burnt area of 10 acres. Temporary barb wires will be run along the edge of the scrub on the south side in order to prevent cattle entering the area after it has been planted. It has been decided to erect a temporary bush hut for the purpose of accommodating tools and other materials on the farm. Dipping tank, mattocks, axes, shovels, and other necessary tools have been procured and are ready for use at the Experimental Station.

Planting.

Ten acres are ready for planting and as soon as plants are available this work will be proceeded with. A further 2 acres, which are to be planted according to American system, are at present being bushed, and this area will be ready for planting on completion of the planting of the 10-acre area. It is proposed to plant 1 acre of Gros Michels in bushed area at 18 feet apart; also 1 acre in the 10-acre area at 15 feet apart. Over 300 plants will be required for this purpose. It is learnt that clean plants of the Gros Michel variety are procurable in the Kennedy district.

QUEENSLAND SHOW DATES, 1929.

The following is the official list of Queensland Show Dates for 1929, as issued by the Queensland Chamber of Agricultural Societies:—

Charleville: 1st and 2nd May.
Taroom: 6th and 7th May.
Kingaroy: 2nd to 4th May.
Beaudesert: 1st to 4th May.
Mitchell: 8th and 9th May.
Boonah: 8th and 9th May.
Wondai: 9th to 11th May.
Mundubbera: 8th and 9th May.
Blackall: 7th to 9th May.
Ipswich: 14th to 18th May.
Roma: 14th and 15th May.
Springsure: 15th and 16th May.
Murgon: 16th to 18th May.
Gayndah: 15th and 16th May.
Goomeri: 21st and 22nd May.
Wallumbilla: 21st and 22nd May.
Biggenden: 23rd and 24th May.
Emerald: 23rd and 24th May.
Toogoolawah: 24th and 25th May.
Maryborough: 28th to 30th May.
Marburg: 3rd June.
Childers: 4th and 5th June.
Lowood: 7th and 8th June.
Gin Gin: 6th to 8th June.
Wowan: 13th and 14th June.
Bundaberg: 13th to 15th June.
Bororen: 17th and 18th June.
Gatton: 19th and 20th June.
Gladstone: 19th and 20th June.
Mount Larcom: 21st and 22nd June.
Buderim Mountain: 22nd June.
Rockhampton: 26th to 29th June.
Esk: 28th and 29th June.
Kilcoy: 4th and 5th July.
Townsville: 9th to 11th July.
Home Hill: 12th and 13th July.
Samford: 12th and 13th July.
Caboolture: 18th and 19th July.
Ingham: 19th and 20th July.
Rosewood: 19th and 20th July.
Laidley: 24th and 25th July.
Nambour: 24th and 25th July.
Bowen: 31st July and 1st August.
Maleny: 31st July and 1st August.
Nundah: 3rd August.
Royal National: 12th to 17th August.
Goombungee: 30th August.
Malanda: 18th to 19th September.
Beenleigh: 27th and 28th September.

WEEDS OF QUEENSLAND.

By C. T. WHITE, Government Botanist.

CASSIA LAEVIGATA WILLD. (AN ARSENIC BUSH).

Description.—An erect glabrous shrub of 5-6 feet. Leaves composed of 3-4 pairs of leaflets, rhachis channelled above and with a prominent oblong upright gland between each pair of leaflets. Leaflets ovate-lanceolate, rounded at the base, and light or dark green above according to situation; much paler (glaucescent) below, varying in size but averaging about 2½ inches long and 1 inch wide. Flowers bright yellow, about 1 inch across when fully opened, borne in terminal or axillary corymbose racemes. Sepals light greenish yellow, unequal in size, the largest ones about 5 lines long. Petals deep bright yellow about 8 lines long. Stamens 10, 3 perfect, 2 on longer and 1 on a short filament, 7 small and sterile. Ovary green, curved, sessile. Pods cylindrical, usually about 3½ inches long; seeds numerous, flattened, about ¼ inch long, brown and shining, horizontally placed and separated by horizontal partitions.

Distribution.—A native of tropical America, now distributed as a weed in most tropical and sub-tropical countries, very abundant in Queensland.

Common Name.—In Queensland most commonly known as Arsenic Bush, a name originally applied to one or two species of yellow-flowered Hibbertias in North Queensland, now more commonly given to several species of Cassia, particularly the present one and *C. Sophera* var. *schinifolia.*

Botanical Name.—Latin *Cassia* (Gr. *Kasiz* or *Kassca*), a tree or shrub with an aromatic bark; *lævigata,* Latin meaning smooth as if polished, referring to the leaves and branchlets.

Properties.—Its local name would lead me to suppose the plant very poisonous, but I have never heard of deaths of stock from it. It is rarely touched by them, but if eaten in any quantity at all would no doubt act as a purge. Senna leaves of commerce are the product of several species of the genus Cassia.

Eradication.—Cutting off below the surface of the ground is most satisfactory in small areas. On large areas arsenical sprays might be employed. The weed is rather one of "scrub" rain-forest edges, along road-sides, &c., than of cultivated land or established pastures.

Botanical References.—*Cassia lævigata* Willd., Enum, Hort. Berol 441.1813.

PLATE 96.—*Cassia levigata* (An "Arsenic Bush").

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MARCH IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING MARCH, 1929 AND 1928, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Mar.	No. of Years' Records.	Mar., 1929.	Mar., 1928.		Mar.	No. of Years' Records.	Mar., 1929.	Mar., 1928.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	8·98	27	8·87	7·69	Nambour	9·60	32	7·57	3·58
Cairns	17·88	46	29·66	21·83	Nanango	3·58	46	2·84	0·50
Cardwell	16·11	56	25·84	9·76	Rockhampton ...	4·74	41	3·67	2 92
Cooktown	15·23	52	10·39	24·78	Woodford ...	8·22	41	7·72	2·34
Herberton	8·12	41	10·45	6·74					
Ingham	15·58	36	26·41	6·89					
Innisfail	26·20	47	26·46	34·50	*Darling Downs.*				
Mossman	17·56	15	19·93	15·47					
Townsville	7·53	57	9·91	7·16	Dalby	2·77	58	4·10	1·28
					Emu Vale ...	2·49	32	4·12	1·56
					Jimbour	2·64	40	3·05	1·11
Central Coast.					Miles	2·75	43	4·23	0·46
					Stanthorpe ...	2·70	55	3 82	1·86
Ayr	6·69	41	16·66	5·84	Toowoomba ...	3·85	56	5·65	1·61
Bowen	5·68	57	7·41	14·36	Warwick	2·57	63	4·34	1·19
Charters Towers ...	3·66	46	7·61	12 15					
Mackay	12·22	57	11·74	23·19					
Proserpine	12·36	25	15·19	17·13					
St. Lawrence ...	5·61	57	1·98	4·77	*Maranoa.*				
					Roma	2 70	54	2·57	0·78
South Coast.									
Biggenden	4·08	29	2·02	1 78					
Bundaberg	5·42	45	2·49	0·93	*State Farms, &c.*				
Brisbane	5·75	78	6·59	2·14					
Caboolture	7·81	41	8·53	2·44	Bungeworgorai ...	1·65	14	2·23	0·76
Childers	4·80	33	3·02	2·07	Gatton College ...	3·28	29	4·15	1·44
Crohamhurst ...	11·76	35	7·36	3·15	Gindie	2·67	29	2·42	1·95
Esk	4·91	41	9·53	2·63	Hermitage ...	2·26	22	...	0·88
Gayndah	3·19	57	1·06	0·32	Kairi	8·32	14	7·88	10·16
Gympie	6·40	58	4·18	2·13	Sugar Experiment Station, Mackay	11·13	31	12·17	22 52
Kilkivan	4·05	49	1·22	1·37					
Maryborough ...	6·22	56	2·50	2·79	Warren	2·66	14	...	...

18th April, 1929.

GEORGE G. BOND,
Divisional Meteorologist.

QUEENSLAND RAIN FOREST TREES.

By W. D. FRANCIS, Assistant Government Botanist.

The Scrub Box is a large tree of the coastal scrubs and rain forests. It is often absent from the interior of the very luxuriant rain forests or scrubs of Queensland. In these heavy forests it is mostly found on or near the margins. It is also common in the open Eucalyptus forests. The species is known in botanical terminology as *Tristania conferta*. It is sometimes called Brisbane Box and Brush Box. The bark on the lower part of the stem is brown or grey and somewhat rough and persistent. The upper part of the stem and the upper part or the whole of the branches have a smooth brownish bark. The trees in moist places often attain a large size, reaching 160 feet in height and 7 or 8 feet in stem diameter. The wood is fairly hard, heavy, and finely grained. It is brown in colour. When seasoned it should be useful for building work in which it does not come in contact with the soil. The species is found as far south as Port Stephens in New South Wales (J. H. Maiden) and as far north as the Burdekin River in Queensland (Bentham). It is also recorded from Port Darwin by Bentham.

Photo.: W. D. Francis.]

PLATE 97.—A LARGE SCRUB BOX (*Tristania conferta*) IN THE RAIN FOREST ON ROBERTS PLATEAU, MACPHERSON RANGE.

Photo.: Dept. Agriculture and Stock.]

PLATE 98.—SCRUB BOX (*Tristania conferta*).

A, flowering shoot; B, shoot bearing empty capsules. The long staminal bundles are conspicuous in the flowers.

FARMERS' ORGANISATIONS.

J. F. F. REID, Editor of Publications.*

Probably there are no more overworked words in the language than organisation, co-operation, and co-ordination when used in relation to agricultural questions. In none of them is there anything magical. The application of the principles they imply means solid hard work, and the use of plain, ordinary, common horse sense. The great danger of co-operative enterprises and organisation schemes lies in the risk of their getting into the control of a hidebound bureaucracy, but that can only happen where those primarily concerned become too apathetic (lazy is the better word), to watch and safeguard their own industrial interests. We all know of undertakings that have been co-operated and organised out of existence, undertakings in which all effort has been put into organisation and none into the real business, with inevitably disastrous results. Even in private enterprise we have known commercial ventures so systematised that all the time of their staffs has been taken up in working the system, and none given to working the business. Farmers, through their own apathy, are not quite blameless for any failure that may attend efforts to organise their industry. Obviously no Government can do for an industry, or an individual, what they should do for themselves. All that a Government may do is to simply supply us with the machinery and the authority, and leave the rest to our own initiative, intelligence, influence, energy, capacity, and ability.

A Road for Men.

I want to suggest that the progress which marks successful agricultural organisation in Australia to-day was not along a pleasant, bitumen-surfaced road, like the road to Redcliffe (or the road to Toowong!) but along a road on which hardship and difficulty were encountered at every turn, a road on which it was almost impossible to straddle deeply-worn ruts. It was not a track for sheep, but a road, the successful traversing of which called, and still calls, for the future towards which it is clearly blazed—for the strength of men to travel.

The Farmer as an Economic Shock Absorber.

In every State in Australia to-day, there are farmers' organisations that are real live bodies with hearts pumping and arteries pulsating with good red blood. No longer, it is evident, is the farmer, whether of Queensland or Victoria, content to be the wood and water "joey" of the Nation, or to be regarded merely as a sort of convenient economic shock absorber for the kings of commerce in the over-grown coastal cities. Each State has now in operation a more or less official scheme of organisation from which definitely good results are being obtained by the agricultural community in the shape of social wellbeing and economic advancement. Developments in rural organisation in Queensland have been discussed before in the course of these talks, and are probably familiar to us all; therefore, it will be more interesting at the moment, perhaps, if we consider what some other States are doing in the way of improving the amenities of country life within the Commonwealth.

A Southern Example.

For a start we will take South Australia, the great grain-growing State, where everybody blesses the name of Farrer—the deservedly famous Australian breeder of Federation wheat. Down there, probably the most important of rural organisations is the Agricultural Bureau, an association of practical working farmers, in effective, though by no means tape-tied (nor tongue-tied) relationship with the State Agricultural Department. I was down there scouting round "on the wallaby track" some little time ago, and had an opportunity of seeing for myself in a necessarily limited field, of course, this Bureau at work, and it impressed one as being altogether based upon a very sound system. It provides the point of contact between the farmer on the one hand, and the expert officers of the Department on the other. It is accepted as the principal channel through which the Department of Agriculture may distribute knowledge gained in the course of its research and investigational work on the experimental farms, in field plots, and in the laboratories.

Down there the common difficulty was experienced of interesting farmers in the work of research institutions, which had been equipped and staffed at great expense. Through the work of the Bureau this difficulty has been largely overcome, and its

* From a radio lecture through 4QG.

services as an institution for extension and educational work, are widely recognised and appreciated.

The Bureau, which has branches in every rural district, provides organised centres from which every farmer in the State can be reached, and so when occasion arises it is possible to establish contact with the farmers of a district in a body; an economical and efficient method when compared with the waste of time and effort involved in an individual canvass. And, because of this fact, it enables a relatively small technical staff to accomplish much more than it could were there no such organisation in existence.

Departmental Outposts.

The branches of the Bureau are, in practice, really live and alert outposts of the Department in rural districts. The co-operation of the branches is sought in every way possible, in the arrangement of tours of duty for technical officers, in the planning and conduct of experimental tests, and in the collection of data on local agricultural matters. Through the Bureau advice on all problems affecting stock and crops, in health and disease, is readily available to farmers. They are encouraged as individuals or as bodies to visit departmental experiment farms and demonstration and experimental plots. Through the Bureau mutual understanding and respect between official and farmer are cordially cultivated.

In the process of its development a tendency of the Bureau has been to concentrate into hands especially trained to treat them, many of the problems, the solution of which is dependent on special knowledge and sustained inquiry .

Coincidentally, it has served to stress the importance of some organisation which provides, among other utilities, an effective educational means in respect to field and technical working plans and policies.

Administration.

The administration of the Bureau is controlled by an advisory Board of Agriculture which is appointed by the Minister for Agriculture. Each year representatives of Bureau branches meet in congress in the capital. To enable branches to be represented at the congress the Government provides transport, without charge, for two delegates, and in many ways contributes materially to the success of what is really an annual Farmers' Parliament.

In addition to the annual congress, country conferences are held in different centres. The constitution, rules, and regulations are simple, elastic, and in no respect irksome.

Among other ways in which the Government, through the Department of Agriculture, assists local branches of the Bureau is by providing stationery and official postage, a copy of the State Journal of Agriculture to each member, and the services of expert officers as lecturers and advisers. Among the practical activities of the Bureau are the conducting of district pruning competitions, farm crop and cultivation competitions, field trials, a winter school for farmers, a Bureau library, and a reference library.

A Women's Auxiliary.

A women's auxiliary, in the form of women's branches of the Agricultural Bureau, has also been established with excellent results. The underlying principle of the Women's Auxiliary is plain. When it is recognised that on the majority of South Australian farms, the poultry yard, the dairy, and the fruit and flower gardens are at least as much the care of the woman as of the man, it must be realised that to restrict the advantages of the Agricultural Bureau to one sex is to hamper unnecessarily the development of these industries. The frequency with which application was being made by women for admission to membership of existing Branches of the Bureau was sufficient to indicate that women were not unmindful of the advantages that the Bureau would afford them, particularly if concurrently with instruction in those aspects of agriculture referred to above they could be given opportunities of acquainting themselves with the principles of home economics; and it seemed reasonable to suppose that the system which for over thirty years had proved successful in so far as the farmer was concerned, was unlikely to fail in the case of the farm woman.

Help for the farm woman, both from the viewpoint of those branches of agriculture in which she was interested, and from the viewpoint of her domestic

responsibilities, was the objective, and the experience of several years suggests that the Women's Agricultural Bureau can and will perform a most valuable service in rural districts.

At each branch meeting common field problems and rural questions generally are discussed, either in debate or by means of contributed papers, and this has proved a particularly effective form of agricultural education.

From what I could see in every State, however, in rural organisation, Queensland is still in the lead, particularly as regards her pooling legislation, commodity boards, travelling technical schools, dental clinics, baby clinics, maternity wards, postal instruction, and rural schools, besides other valuable and important auxiliary services such as the Queensland Ambulance Transport Brigade (one of the most efficient systems in the world), and that provided by the Country Women's Association and other organisations, religious, educational, and social, that are doing so much to help us in the attainment of a complete national life.

LEGUMES—THEIR IMPORTANCE.

Every farmer is now familiar with the group of plants known as legumes (so called because their "fruit" which contains the seeds is a legume or pod). These plants are of the highest value and possess characteristics that distinguish them from all others, notably the high protein content of their seed, the excellent feeding value of their whole vegetative system, and their capacity for storing nitrogen in their roots and thereby leaving the soil actually enriched in that important item of plant-food.

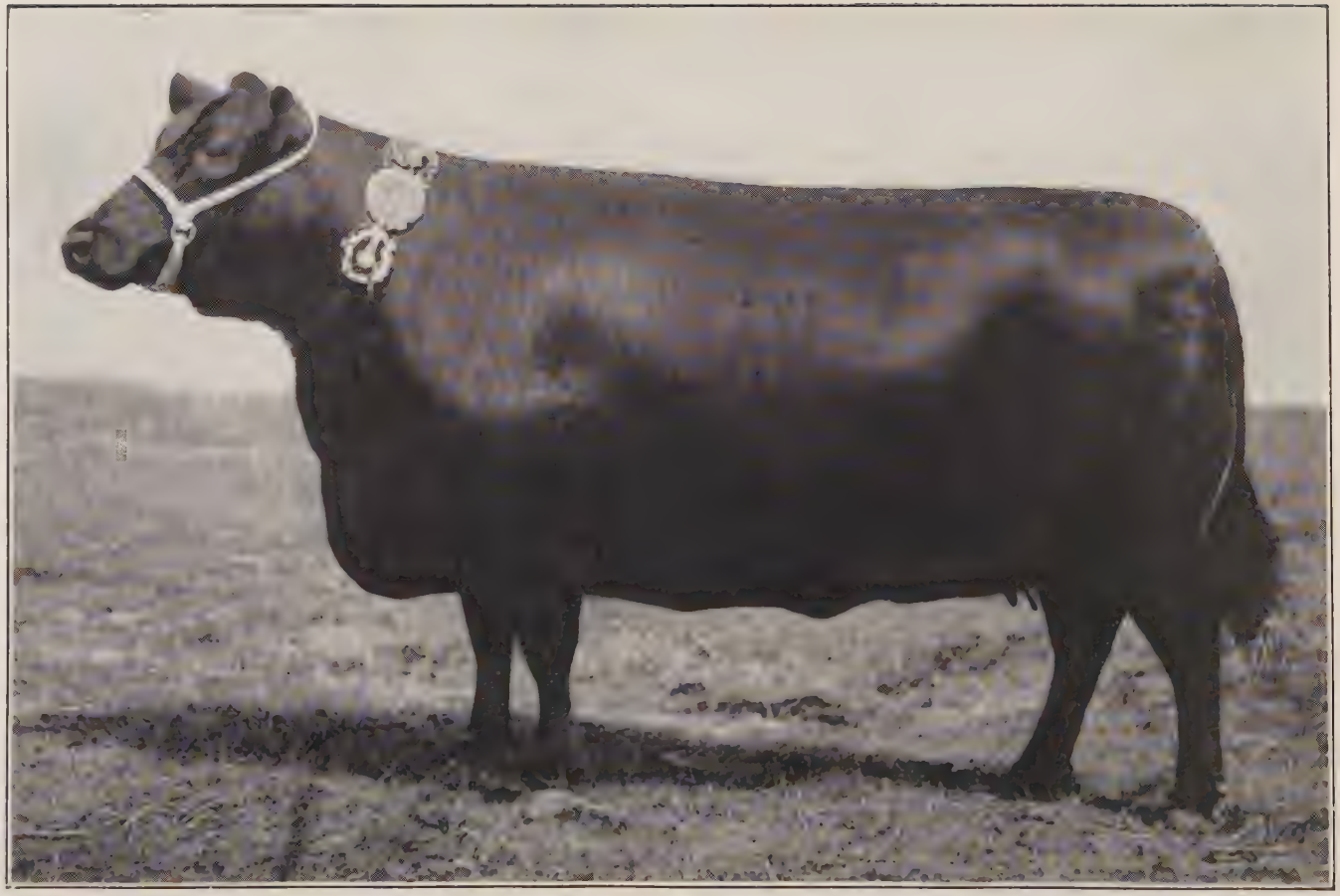
In New South Wales legumes are grown for various purposes: Lucerne for hay and grazing, clovers as an important constituent of pasture mixtures, field peas, vetches, cowpeas for green fodder and hay, and also for green manuring and soil renovation, and garden peas and beans for the vegetable market and home use. Their place in our farm practice, indeed, is even larger than might be apparent at first sight, for the "herbage" that springs so abundantly on wheat lands when these are "left out," and that is so highly esteemed as pasture, consists largely of trefoils, which are as much legumes as lucerne or clover.

The secret of the value of these plants to the farmer is the possession of a source of plant-food that is not accessible to most other plants, particularly not to cereals. The practical experience of hundreds of years led farmers of past generations to believe that leguminous crops possessed some peculiar power of making succeeding crops grow better, and it was not till the last twenty-five or thirty years that this could be explained. It is now known that association with certain bacteria in the soil enables legumes to make use of the air in a way that other plants cannot.

This association is one of mutual helpfulness, or symbiosis, the bacteria requiring considerable quantities of certain kinds of foods that are generously supplied in the plant juices of legumes, while the plants derive from the bacteria, in some way not yet fully understood, a supply of nitrogen that the bacteria have taken from the air and built into nitrogen compounds within their own cells. It is supposed that the nitrogen compounds thus manufactured by the bacteria are diffused through the cell walls and absorbed into the general circulation of the plants, where they are used for the building up of the protein compounds that are characteristic of the legumes in whatever form they are considered.

The presence of these bacteria is indicated by the development on the roots of the little growths now universally known as "nodules." These little swellings vary from the size of a pin-head to the size of a small pea, and they may sometimes be seen by carefully digging up a plant with as many of the small roots as possible and then washing away the earth in a gentle stream of water.

There is unfortunately an impression amongst farmers that, if the leguminous crop is removed from the land and the roots with their nodules remain, the soil is thereby enriched in nitrogen. It must be clearly understood that the nitrogen taken from the air by the organisms does not exist in the nodules, but is made use of and distributed throughout the plant, and that the removal of the above-ground portion of the plant from the land means the removal of a large amount of nitrogen. An increase in the nitrogen content of the soil can only result from the growing of leguminous crops when they are fed off, ploughed in, or soiled to stock, and the resultant manure from the stock returned to the soil.



From "Farming"—an English Publication.] PLATE 99.—BRITISH BREEDS OF LIVESTOCK.

The type of Aberdeen Angus Cow favoured by breeders in the Old Country.

PLATE 100.—BRITISH BREEDS OF LIVESTOCK.
A type favoured by Jersey breeders in Britain.

[From "Farming"—an English Publication].

AUSTRALIAN PIG INDUSTRY COUNCIL—ANNUAL MEETING.

At the third meeting of the Council for the Australian Pig Industry held at the Commonwealth Bank Offices, Sydney, on 25th March last, representatives were present from New South Wales, Queensland, Victoria, Tasmania, and South Australia, as well as from the Commonwealth Department of Markets and Transport. Mr. George W. Gordon, of Raleigh, New South Wales, was re-elected chairman and presided over the gathering.

The Council approved of the appointment of Mr. A. F. Gray, Senior Piggery Instructor, Department of Agriculture, New South Wales, and Mr. William Gamble, a member of the Victorian Council of Agricultural Education, to represent the Agricultural Colleges on their State Pig Industry Committees. It was also approved that Mr. Mitchell be a representative of the New South Wales Pig and Poultry Farmers' Association on the New South Wales committee. It is expected that a recommendation will shortly be made by that committee for the appointment of additional representatives to the Committee of the Proprietary and Co-operative Bacon Factories.

With reference to the question of forming committees in each of the States for the stabilisation of prices the chairman reported that a body of this nature had been formed in New South Wales under the title of the New South Wales Bacon Curers' and Distributors' Association, consisting of proprietary and co-operative bacon manufacturers and wholesale agents. The Queensland members intimated that the Queensland Bacon Curers' Association, comprising proprietary and co-operative companies, which was formed some time ago and which determined terms and conditions of sale and the matters relating to the branding of bacon in Queensland, was working smoothly and satisfactorily. The Council recommended that similar Associations be formed in Victoria and South Australia.

Experiments in Breeding Pigs.

Mr. A. J. Mackenzie, Instructor in Animal Husbandry, at the Gatton College (Queensland), gave an interesting address on the experiments in breeding pigs being conducted at that College.

Pig Nutrition.

A paper on Pig Nutrition was prepared by Mr. Lance le Souef, Melbourne, and copies were distributed to the members and referred by the Council to the State Pig Industry Committees for comment with the object of discussion at the next meeting of the Council.

Propaganda to Increase the Home Consumption of Pork Products.

After reports were received and progress in the different States noted, it was decided to refer the matter back again to the various State committees for further action.

Fire Branding of Pigs.

The New South Wales committee reported that provision had been made in the new draft of the proposed amendment to the Pastures Protection Act for the inclusion of a clause which would give certain powers to carry out the wishes of the Committee with regard to branding pigs. The Victorian Committee considered it was not necessary to request the State Government to introduce legislation to provide for the compulsory fire branding of pigs. Experiments are being conducted in that State in the tattooing of pigs. The State Committees are to submit further reports at the next meeting.

Inspection Certificates.

The question of the acceptance by State authorities of certificates relating to pork products issued by the inspectors of other State Governments was considered. It was stated these certificates are already accepted by the Victorian and Queensland Government Departments. The matter was referred to the New South Wales and South Australian committees for further report.

Mortality in Young Pigs.

This question is now being investigated by the Council for Scientific and Industrial Research and it was decided by the Council for the Australian Pig Industry

to ask State Government Departments, Agricultural Colleges, and other bodies conducting experiments with regard to the breeding and feeding of pigs to give special consideration to the subject of mortality in young pigs.

Payment of Compensation for Pigs Condemned on Account of Tuberculosis.

A lengthy discussion took place on this subject and it was definitely decided to refer it to the State Committees of New South Wales and Victoria for further consideration as far as their respective States are concerned and for report to the next meeting of the Council.

Transmission of Hams per Parcel Post.

The Queensland members intimated that there was a good demand for hams to be despatched per parcels post, particularly at certain seasons of the year, e.g. Christmas and Easter. It was therefore decided to approach the Postmaster-General's Department with a view to having postal regulations amended in order to permit the acceptance for transmission by parcels post of hams securely packed and of a maximum weight of 15 lb. Present regulations do not permit of this.

The next meeting of the Council will be held in Brisbane immediately prior to the Brisbane Show in August next.

PIGS AT TOOWOOMBA SHOW—1929.

A particularly good entry of fine quality pigs, placed before the judge under much more favourable conditions than is possible at many of the smaller country shows, was evidenced at this year's Toowoomba Show, where, under favourable weather conditions and with bright seasonal prospects, the entry indicated the growing importance and popularity of this branch of agriculture on the far-famed Darling Downs.

The time taken in preparation and the enthusiasm displayed by the various exhibitors indicate the future success of the industry. If one can judge by the quality of the stock, and particularly the very fine entries of bacon pigs, then pig raising will continue to be a profitable and popular venture and the stock produced will be in great demand in Southern Queensland.

The pig industry on the Downs appears to be on a very sound financial basis and judging by the capital invested in the Darling Downs Co-operative Bacon Company Limited, and the results of the year's activities at the factory at Willowburn, it is apparent that "money in pigs" is no mere slogan but an actual fact. It is evident, too, that the products of the factories on the Darling Downs (for there is another successful factory at Mill Hill, near Warwick, conducted by the Warwick Bacon Company Limited) continue to find a ready market not only in this State but in the markets of the South where profitable prices are obtained.

Breeds.

Berkshires and Gloucester Old Spots were equal in general average, though there were more entries of the former than of the latter. Tamworths made a good showing as also did a very fine pair of Duroc-Jerseys, but the Yorkshires and Poland-Chinas were not up to standard and were present in very small numbers.

The porkers were an even lot and the eight pens, each containing three prime quality bacon pigs, were equal to any in the State. They were all shown in excellent marketable condition.

The veteran Council Steward, and the officer in charge of the Pig Section, together with the exhibitors, endeavoured to make the section an attractive and popular one, and the fact that so many people interested themselves in the exhibits was sufficient justification for the space allotted and the expense incurred in penning such a fine exhibit.

Hams, Bacon, Lard, and Small Goods.

The display of hams, bacon and other factory products was of high standard and indicated the wide range of products obtainable from the carcass of the hog. Unfortunately, competition was reduced to the exhibits of the Darling Downs Co-operative Bacon Company Limited, but, nevertheless, the quality was of such a high standard that any other competitor would have to show exceptionally good products in order to win. The trade display of bacon factory products was attractive and of great educational value.

SCHOOL OF INSTRUCTION TO PIG FARMERS AT GATTON COLLEGE.

Attention is called to the annual school of instruction to pig farmers, to be held at the Gatton College during the period 10th to 20th June, 1929.

The schools have been organised to provide the means whereby farmers, their sons and daughters, desirous of improving their knowledge of pig-raising, may come together at a convenient centre for the purpose of meeting one another and attending practical demonstrations and lecturettes, indoor studies, &c., on every phase of pig-raising.

As early application is necessary, it would be well for those interested to get in touch with the Principal of the College so that arrangements may be made in ample time before the school opens.

Professor Murray advises that there need be no fear on the part of the farming community with regard to the attendance at this school of members of their families, for provision has been made for accommodation and meals, and those attending can be assured their personal wants will not be overlooked. The social side of the life of these schools is a special feature. Every evening before the lecture session begins, a free and easy hour for questions and answers, during which questions relative to any branch of agriculture may be asked, has been arranged. At these sessions officers attend who are interested in other branches of college life; in fact, question time is one of the most interesting periods of the day for those interested in orcharding, dairying, and other branches of farming, as well as pig-raising. The evening cinematograph and lantern lectures are also of interest and value and are much appreciated. As opportunity offers, prominent authorities on agriculture, apart from departmental officials, will give addresses. An added attraction to the school programme is the visit of inspection to the metropolitan bacon factories.

The school fees are exceptionally reasonable and concession fares on the railways are available to those attending. Further particulars may be obtained by writing to the Principal, Queensland Agricultural High School and College, T.P.O. South, or from the Department of Agriculture and Stock, Brisbane.

It might be mentioned that at the College piggery more than 300 pigs are kept. These comprise representatives of the several breeds in Queensland, and they are bred for stud purposes as well as for the production of pork and bacon. An extensive series of experiments in the breeding of pigs has been recently added to the activities of the pig section. These experiments are under the control of the Departments of Public Instruction and Agriculture and Stock, and of the Queensland Pig Industry Committee as representing the various bacon factories. Considerable interest is being displayed in the results of crossing the various breeds together, and this section should be of considerable interest to those attending the Pig Farmers' School. Several lecturettes will be arranged to indicate just what is being done, for the objective is to test out under farm conditions the prolificacy, suitability, early maturity, and economy of production of various types of pigs. The pig section, therefore, is one of great educational value and one in which farmers generally will be interested.

A VALUABLE HELP.

A Bauple reader writes (4th March, 1929):—"The Journal I find is a most valuable help to me in many ways. The advice and hints contained therein, if followed closely, do much to make farm life and work more easy; so much so, in fact, that much useless labour may be omitted and much more profitable work accomplished. The fact is that work done does show more satisfactory returns when the Journal's advice is put to practical use. Wishing you and it every success."

WEANING THE PIG.

E. J. SHELTON, H.D.A., Senior Instructor in Pig Raising.

ONE matter worthy of special attention on the pig farm is that dealing with the correct age at which to wean pigs. There is no hard and fast rule that must be followed to ensure success, as the age at which to wean pigs will depend largely on the system of management that is followed on the farm and the development of the litter. If it is intended (as it should be) that the sow is to produce two litters yearly, it will be necessary to wean the pigs as early as practicable in order to allow the sow being mated in time for the next farrowing. For this reason, it is advisable to wean the pigs when they are eight weeks old. The sow carries her pigs for four months (the gestation period is usually 112 days), and suckles them for two months, making six months in all with each litter. Generally the sow will come in season three days after farrowing, and every three weeks after that, although it rarely happens that the sow will show as being "on heat" before the ninth week after farrowing, and it is at this ninth-week period when she should be mated to the boar.

Some breeders are able, in the case of a sow with a very small litter, to induce the sow to come in season by keeping her and her litter separated for several nights in succession at about the sixth week after farrowing, or even sometimes at the three-day or three-week period. In such cases it is an advantage to feed the sow liberally after going in pig and to allow her to suckle her pigs for a longer period;

PLATE 101.

A group of weaners of the Berkshire type engaged in a hunt for peas in a crop of cow peas into which they were turned to graze while they were passing through the weaning and slip stages. The other food consisted of milk and cereal meal and they had ample drinking water and charcoal.

but this system can only be recommended in cases where the sow has a small litter or where she is carrying plenty of condition, for the gestation and lactation periods are severe on the dam and impose a double burden on her at a time when she should be building up her body in preparation for the litter to arrive and be suckled.

If the young pigs, when about three or four weeks old, are provided with a small trough (concrete, steel, or block tin preferred) placed in some convenient spot where the sow cannot get at it, they will soon learn to eat and drink freely, and if they are also allowed good pasture the process of weaning will not be difficult and the pigs will not be checked in growth; also the strain on the sow will not be so great if the young pigs are handled in this way. Both sow and suckers should be allowed an abundant supply of drinking water. On the other hand, if the young pigs have to fight for a mouthful of food at the trough where the sow, and, perhaps, other pigs are feeding, then the weaning period will be severe on the pigs, and the sow will not do as well. For three or four days before weaning the sow should only

PLATE 102.—A THRIFTY PROFITABLE LITTER.

Tamworth-Berkshire Pigs, fourteen in number. They were eight weeks old at the time the photograph was taken. They were the property of Mr. George Stanfield, of Wondai, Q.

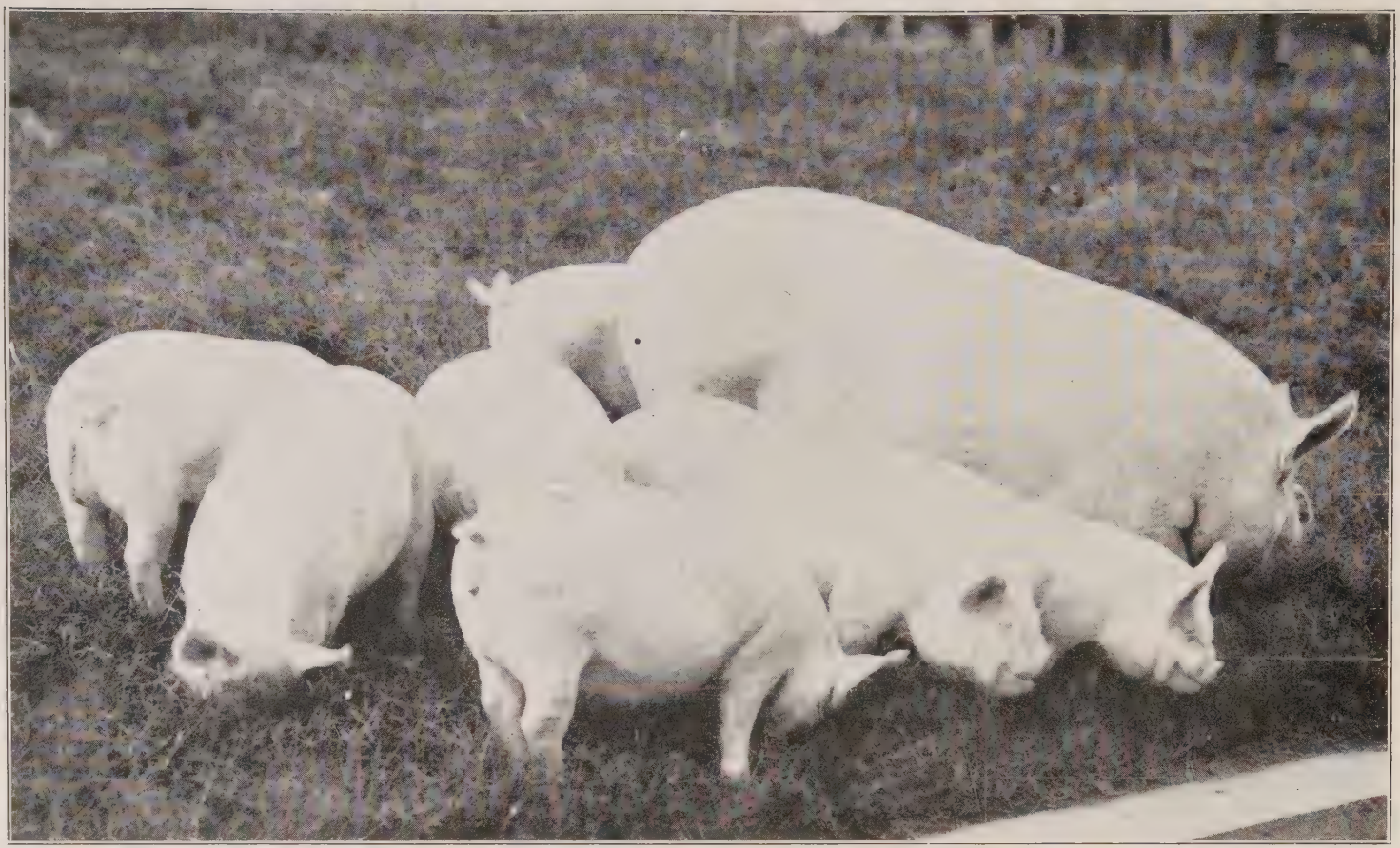


PLATE 103.

Prize winning weaners of Middle Yorkshire breed, property of Mr. Ralph Joyce, a prominent Victorian breeder. The sow only reared seven pigs of this litter, but she made an exceptionally good job of her share of it, while the owner did not spare the feed given to the rapidly developing youngsters.

receive about one-half of her ordinary ration; this will cause a decrease in the milk flow. The sow should then be taken away from the litter, leaving the young pigs in the surroundings to which they have become accustomed. The pens and pastures in which they are kept should be clean, sanitary, and of good area, and so be conducive to rapid growth. The sow should be carefully handled until her milk supply ceases. Some breeders allow the smallest pigs to remain with the sow for about a week after the largest ones have been weaned, and this practice is to be commended, particularly if the sow has an abundant supply of milk and has been rearing a large litter. It is a decided advantage, if it can be arranged, to allow a small, weakly litter to remain with the sow until the pigs are about ten or twelve weeks old, in order to give them the additional benefit of the sow's milk, but this is seldom necessary if the young pigs are taught to eat from a separate trough whilst still suckling.

Young pigs should be given an allowance of lime water in their food two or three times a week; they should also have access to clean water, and should be provided with charcoal, bonemeal, wood ashes, and a lump of rock salt. Under these conditions, weaning should not check the development of young pigs.

Profitable pigs should grow rapidly, mature early, and be ready for marketing as soon as possible at the lowest cost of production, with the least amount of labour, and with the maximum of saleable meat and a minimum of loss. This cannot be done unless they receive a good start in life and unless they recover from weaning without the all too common check in growth. Strictly speaking, the time to start caring for young pigs is long before they are born, for the strength and development of the pigs at birth depends entirely upon the feed, care, and attention given to the sows, and upon the type, quality, and condition of the sires. In addition to this, the very best pigs may be absolutely ruined and checked in their development if special care is not taken to see that they pass through the weaning stage without loss in weight or check in growth.

Do not Wean Pigs too Early.

It is a serious mistake to wean pigs at four, five, or six weeks of age and expect them to develop and mature to advantage, especially where, immediately after weaning, they are offered for sale and transferred to new owners. They then receive a change of food and environment and entirely new conditions of life. Pigs treated in this way seldom prove a good investment. If they survive they develop into slow growers and are unprofitable. Of course, even these adverse conditions can be overcome by giving them extra care and attention, but the system is not to be recommended, for, by allowing them to remain with the sow for another two weeks they would develop to more advantage and sell better. Breeders who handle pigs in large numbers and feed them on the refuse of hotels, cafes, markets, and on butter milk, will not purchase very young pigs, for they have learnt that such pigs are not profitable. Taking the amount of profit into consideration, the sow's milk is the cheapest and most efficient food for pigs of one to three months of age, supplemented (after the first month) with other and equally nutritious foods. It is more profitable to give the sows additional supplies of food in order to obtain continuous milk production, than it is to wean pigs at six weeks and attempt to force them on more rapidly than they will develop while suckling. If the food which the very young pigs are receiving is supplemented in the manner indicated, the result will be far more satisfactory, both for the litter and the sow. The sow's milk production may be increased by efficient feeding and handling in just the same way as milch cows, and every dairy farmer knows how rapidly the milk flow increases when conditions are favourable and a good supply of food is at hand.

Castrate the Young Boars at Six Weeks.

It is an advantage to castrate all male pigs not required for breeding purposes when they are six weeks of age and before sexual maturity is reached, as at this age there will be considerably less shock to the nervous system and the growth and development of the pig will not be checked. If the pig is still suckling its dam when castrated, the wounds, if kept clean, will heal up rapidly, and the pig will become more thrifty, and will be in a better condition for weaning. A five or six-weeks-old pig is small enough to be handled conveniently, while the testicles will be large enough to render their removal easy. If the castration be correctly performed, within a few minutes of being released from the operation the young pigs appear normal and are soon suckling and eating again, while older pigs are sickly, sore, and very stiff for several days, eating and drinking little. There is also considerably less pain associated with the operation if performed at six weeks of age.

Weaning, an Important Subject.

It will be seen, therefore, that weaning the pig is quite an important item in the profitable management of pigs. Further information may be obtained at any time on application to the Department of Agriculture and Stock, Brisbane, where, also, many useful pamphlets on pig raising may be obtained gratis.

PLATE 104.—A PRIZE-WINNING LITTER

A prize-winning litter of Middle Yorkshire pigs at weaning age. Note evenness of type and good quality of these pigs, and the medium condition of the sow.

USE AND CARE OF MILKING MACHINES.

Milking.

Keep the milking shed, yards, and surroundings in a clean, sanitary condition. Wash the cows' teats in clean water, and draw milk from each teat and ascertain if the milk is normal before putting on the teat cups. To place the teat cups in position bend them all down except the one you are going to attach to the teat; attach each cup in like manner. When the cups are all attached and the milking is proceeding satisfactorily, do not interfere with the machines until the cow is milked out. See that no air enters the cups and destroys the vacuum; this defect is indicated by a hissing sound caused by the air rushing into the cups.

Should a cup fall off the teats give it immediate attention, as the suction will draw dust and particles of dirt into the system and contaminate the milk.

The cleansing of the milking machines is the most important part of the dairyman's operations. Failure to thoroughly wash and properly cleanse the plant after each milking will result in the production of low-grade milk, cream, and dairy products.

Cleansing the Machines.

After completion of milking do not delay in carrying out this important work, which will, if properly performed, materially assist in producing high-grade milk.

Turn off the air tap in each bail. Start at the end bail and clean adhering particles of dirt from the outside of the cups and claws so as to prevent the dirt entering the flushing water. Then thoroughly flush each unit in turn by drawing through it at least half a bucket of cold water, dipping the cups in and out of the water so as to draw in air during the flushing. A thorough flushing out with cold water will remove traces of milk and grease from the rubber teat cups, pipes, releaser, &c. Always use cold water for this flushing. On no account should hot water be used, as it will tend to cause casein to become caked on the inside of the pipes. Scalding water at a temperature of at least 180 deg. Fahr., to which may be added one tablespoonful of washing soda to every 2 gallons, should then be drawn through the cups and pipes, care being taken to admit the water slowly at first in order to gradually heat the sight glass so as to prevent its breakage. Thoroughly clean the milk pipe line by means of the brush supplied with the machine, and according to instructions. The air pipes and vacuum tank, which frequently become foul owing to milk vapours entering and condensing in them, should be regularly cleansed and sterilised with boiling water. With machines in which water can be drawn through the air pipes by means of the vacuum pump, care should be taken not to flood the vacuum pan, thereby causing the water to get into the pump. The sterilisation of dairy appliances and equipment is most effectively and economically done by boiling water, and where it can be utilised nothing is usually gained by the addition of chemical disinfectants. When the cleansing of the piping is completed, open all taps and leave the pump running for a few minutes to dry out the pipe line. This assists in keeping the plant in a sanitary condition. Leave all pipes open when the plant is not in use, so as to allow the air to circulate through the system. The releaser should be detached, thoroughly cleansed, and allowed to dry.

Cleansing the Teat Cups.

When the flushing out of the machine as described has been completed, remove the teat cups and rubber connections. Dissemble the cups, and carefully brush the cups and claws with a dairy scrubbing brush. This should be done in hot water in which soda or a cleansing powder has been dissolved. It is essential to remove all grease in the first flushing and to then brush and cleanse the rubbers. If the rubber inflations have not been thoroughly cleansed they will be sticky to the touch, which is an indication of a film of grease on the rubber. The surface of a well-cleansed rubber will cling when the finger is rubbed along it. Careless cleansing will allow the grease to penetrate the surface of the rubber to the extent that it cannot be scoured out, and the rubber will perish. Rubbers so affected should be discarded. Careless cleansing of the inside of the teat cup cases gives rise to corrosion and pitting of the surface. Where cups have screw caps the cleansing of the threads should receive attention, and a slight smear of vaseline applied to threaded parts will assist in keeping them in good order. The dissembling and cleansing of cups and claws should be done as frequently as possible and not less than three times a week.

Cups and rubbers, after being cleansed, may be either left in an antiseptic solution or may be dipped in same for fifteen to twenty minutes, then removed and

placed in a suitable receptacle in a cool place, away from the light, and protected from flies and dust. The vessel in which the disinfecting solution is held must be large enough to allow the teat cups and rubbers being immersed in the solution without doubling the rubber tubes in a manner to prevent the complete displacement of air by the disinfecting solution.

Several solutions for dipping or soaking the cups and rubbers are recommended by manufacturers of the different milking plants, and include chlorine compounds, lime water and permanganate of potash, and brine solutions.

Special attention is drawn to the necessity of removing all traces of the solution that may be used for the sterilisation of the cups, rubbers, pipes, &c., that come in contact with milk, before the machine is again used. This is done by flushing each unit with sufficient hot water to effectively remove any trace of the solution before commencing to milk.

Many dairymen object to very hot water for cleansing rubber, believing that the rubber is destroyed. The judicious use of hot water will do no harm to rubber, provided that all grease is removed from the rubber before the hot water is applied. Rubber, if kept in water for ten to twenty minutes at a temperature of 165 to 175 deg., will be unharmed by the heat, and most bacteria which detrimentally affect milk will be destroyed. If the rubber is placed in water at a temperature of from 180 to 190 deg. Fahr. long enough only for the surface of the rubber to be heated to the same temperature, the same object will be attained without injury to the rubber.

Lime a Suitable Disinfectant.

An efficient disinfecting solution is made by adding two pounds of quicklime to ten gallons of water. Stir well and allow the solution to settle. Pour off the clear liquid and immerse teat cups and rubbers in it for a period of fifteen to twenty minutes.

THE CULT OF THE COLT.

"By "U 9 L."*

IX.

KICKING AND OTHER BAD HABITS.

This colt we're handling now seems possessed of all the imps of perversity. It won't do anything right, and so far as it lies within its power it seeks to annoy us. Lately, and since we've been buckling the girths on it, the brute's adopted a habit of cow-kicking. That's a low-down trick, and it's one only to be expected of a base-born caitiff such as this. Apart from everything else it's a breach of good manners. Sometimes, rarely, a stick isn't a bad idea. And other times, mainly, a stick is only an inducement to continue the malpractice. That sort of thing has just to be overcome by custom, by familiarity and by teaching the thing that we're not hurting him intentionally. In that way do we curb his ulterior ambitions, and always, with any sort of a colt at all, must we restrain our own baser motives.

Punishment a Last Resource.

Kicking, striking and biting all come within the same category. A man needs to be a jolly good judge of equine temperament to know whether a stick's going to be efficacious or not, and if he muddles the job at all it only makes the offence more aggravated and of a greater hair-trigger disposition. Leave punishment alone till all else has failed. As a last resource, perhaps, it may be useful to tie up one fore leg. You just double the leg and put a saddle strap round it. It looks a fragile tie and one on which a man wouldn't place much reliance. But it's safe as a bank. Most horses on three legs have to stay on those three legs to preserve their balance at all. That means they can't kick. That is the time for a man to move about them and to get familiar with them. Sometimes, odd times, a man may cure a devil in that way. At other times the cunning brute merely waits for the odd leg to be released before recommencing its tricks, and again odd ones are able to balance temporarily on two legs and use the other as a means of offence. The whole

---

* In the "Pastoral Review" for January, 1929. Previous notes on this subject by the same interesting and well-informed writer were reprinted in the March, August, October (1928), January, February, March, and April (1929) Journals, from the February, April, May, July, September, October, and December (1928) numbers of the "Pastoral Review."

thing is a ticklish job, and no fitting remedy may be recommended without a diagnosis of the colt's temper. That entails a personal inspection, which isn't possible through the keys of a typewriter.

When a Rider wants Springs in his Boots.

Another fiendish aggravation which this horse adopts is that of refusing to stand when we go to mount. We're supposing we're man enough to be able to mount the thing even while it's in the process of going through the ring of the bit, if need be. But that's not good breaking. This colt has to stand while we clamber on him, and he's got to be steady enough for the oldest boundary-rider to mount before he leaves our hands.

"Rein him up and make him stand" is the advice given. "Pull his head round on to his shoulder and hold him." That, and sundry other advices are handed out free and regular. And they're no good! If a colt's head has to be pulled round to his shoulder to make him stand he always looks for it. If it's not done then he takes advantage of that omission, and a rider has to have springs in his boots to mount him. Don't pull a horse's head round, that's my advice. Hold him with a reasonable degree of firmness, by all means, but don't make a contortionist of the horse when you go to mount him. If you have the ability to mount him steady and without fuss you'll find that the colt will reciprocate. He'll steady down with custom, and provided you don't make a mull of any mount he'll come to his senses and your notions in no time.

The Best Position for Mounting.

As always, the best position when about to mount a touchy colt is right in close to him. Keep your own body pressed against him, your knee in his shoulder, and above all see to it that you keep in close all the time you're in the air and that your right arm is bent at the elbow. That's the big point: that crooked elbow. That gives you command of position and elasticity of action.

Though I haven't referred to "lugging" a colt, that advice is almost sure to be handed you. And however vehemently the advice is tendered, I as emphatically say No! It makes the colt stand—that's admitted—and in that motionless position you may climb on in comfort. You can't! Apart from that, it's only teaching the thing bad manners. It's making it touchy about the ears it's teaching it that it may only be mounted when "lugged," and the day isn't too far distant when that colt is going to refuse to allow you to catch hold of its ear. In fact, it's going to be a dickens of a job to get the bridle over its head at all, That's what's going to happen.

Don't Rush the Mounting Process.

If you have the necessary length of limb and the agility to indulge in lugging, why not adopt a better and more harmless method of achieving your purpose? This is it. You have the colt reined ready to mount, and as you lift your foot to put it in the iron that colt commences to wriggle in preparation for a bound, and perhaps it takes a step forward. Don't put your foot in the iron. Instead of doing that follow another course. Drop your left hand from the crest of the horse's neck and put it round quickly under his neck at the point where that neck joins the chest. Gather a bit of loose skin there and hold it firmly in your clenched hand. That makes the brute stand without the application of undue force and easily. In fact you may mount him from that position and he'll not move during the process. But it's risky, though it has been done, and I maintain that the recovery from that position is little more difficult that from the lugging position. Anyway, if you do that several and sundry times when about to mount you'll find that the colt responds quickly and in next to no time he'll stand while you mount. But please don't rush the mounting process. Nothing is more conducive to a colt's uneasiness than a hurried mount. It can be done almost as quickly, twice as safely, and better in every way if there's no hurried haste.

Man and his Mannerisms.

At about this stage I'd like to repeat that a horse, particularly a colt, gathers its own mannerisms from the man who's handling it. Later on in life, when the thing's older and more set, it borrows something of the mentality of the man who regularly rides it, but in its stage of educational infancy it's quick to pick up notions and habits from the man who's teaching it. I point that out, not necessarily that a man may make use of it to his own benefit, but so that a breaker may understand it's better and more fitting that he curbs his temper and always preserves an even amiability towards his charges.

If, in any of your actions—mounting or anything else—you give the colt an impression that you're nervous about it, then as sure as eggs that colt will be fearful in the same operation. If you rush your mount, so will the colt try and make a lightning process of it; if you shirk any risk, so will the colt take advantage of that timidity; and in a hundred and a dozen ways it is right that the breaker should meet his colts with an even temper and without fear—a feeling of comradeship is, perhaps the best way to explain it.

We're done with this sour-tempered brute now. Of course, there are dozens of little faults and foibles which I've omitted. To deal with them all in detail would be an endless task, and anyway, the whole thing is distasteful. Though a breaker may not be able to make a horse of the thing, at least he knows he's not spoiling one—it could never be a horse worthy of the name. I'll deal later with sundry little tricks which may help to overcome fractiousness, but as they would apply equally to all sorts of horses, I'll leave them for the time being and now refer to the very important part of riding.

BUCKJUMPERS.

Horses don't buck like they used to. We'll take all that as read. If we doubt it we can get confirmation from many greybeards, and at least their word is worthy of respect.

Even so, in more or less recent times I've known 'em switch their tails in an offensive manner. I'll agree, however, with anyone that not one per cent. of so-called buckjumpers can buck. In the vast majority of cases that bucking is only rooting, and the rest is built on imagination and inexperience. Still, odd ones do.

The big question before the council is: Should or should not a buckjumper be flogged. This refers to the breaking, of course. Rather it applies to the riding after the first spell, and when the horse has learned to balance his load. Some men can do it, and they like to do it. Others have a notion that they'd like to do it, and their attempt ends in disaster. That's bad for the colt, and it doesn't benefit the man. My idea is that if a colt likes to go steady then by all means let him proceed evenly, and if he bucks properly then I'm so fully occupied usually I haven't time to think of anything else. Apart from everything else, and whether a man's able or not to do it, it's a question of judgment of character—psychology is the word, isn't it?

When "Pronging" the Pigskin.

If you take a colt steadily, soothingly, and if you treat him in a brotherly fashion, and he will persist in putting his head down and cutting capers, what about it then? It depends entirely on what prompted that outburst. It may be fear, it may be that the thing's uncomfortable, it may be a little display of animal spirits, and it may be vice. For the first three I'd enter into the spirit of the thing and mix it mentally with the colt while he indulged his whims, and for the last I'd pour the mop into him good and plenty, soaking him till he cried crack, and then hand him some more for good measure. Mind you, it may be wrong, and it might only add to the colt's bad temper. But if the display is prompted by vice then I maintain there's no harm done. It will grow worse itself if let alone, and there is a chance of nipping that evil in the bud. There's a don't attached to this, of course: Don't get thrown. If you're tossed then you've taught that horse a bad example which is going to take much erasing, and you've landed yourself in a dickens of a mess—if you're a man at all you're the one who's going to rectify that error.

Riding a Rough 'un.

Riding a buckjumper is easy—to some people. I've known two—no, three—men to whom it was a natural gift. To the rest of us the art is acquired with much practice, with many pains—like genius—and with stiff limbs and sweat of blood. And then, once you've got there, you must keep in practice. The art of the whole thing is in anticipation—you think just one shutter-click of time ahead of the horse what he is going to do next, and you anticipate that move in readiness for it. That's all. One of the gifted riders to whom I refer—the third—explained it slightly differently. He stated that the rider lost a certain amount of ground, or position, with every leap of the buck, and that he regained that lost position, and a bit more, every time the horse hit the ground. That's easy, too, to gifted horsemen. A breaker must be able to ride, of course, and as I've stressed from the beginning he must be in mental accord with his horse and know when and where not to do things. There you have it in a nutshell whether a buckjumper should or should not be flogged.

Answers to Correspondents.

BOTANY.

From the outward mail of the Government Botanist, Mr. Cyril White, F.L.S.

Queensland Kauri—American Redwood.

T.A.P. (Toowoomba)—

Your specimen is the Queensland Kauri, *Agathis robusta*. The New Zealand plant has much smaller leaves than ours. The leaves on coppice shoots or on young trees in the New Zealand plant are very much narrower than in our species. There is no doubt about the determination. The germination is generally poor in Queensland Kauri, especially in the seeds from cultivated trees.

We do not know how you will succeed with American Redwoods. The only place we think where this tree will do will be in the highlands of South-Eastern Australia. We have seen trees at Ballarat, but on the whole it does not seem to do as well as its sister species, the Giant Tree or Big Tree, *Sequoia gigantea*. It is, however, generally regarded as being very much superior as lumber.

Carpet Grass.

S.F.W. (Upper Coomera)—

The sample of grass forwarded by you is *Paspalum platycaule*, the Carpet Grass, a native of the warmer parts of America, but now widely spread over the tropical and sub-tropical regions of the globe. It is very common in North Queensland, and less so in the South and the Northern Rivers of New South Wales. It has rather a mixed reputation as a fodder, but for good soils is not equal to the ordinary *Paspalum*. For poorer soils where the common *Paspalum* does not do too well, it is a useful grass.

Yellow Oleander—A Poisonous Plant.

H. (Rosalie)—

Your specimen is *Thevetia neriifolia*, sometimes known as the Yellow Oleander, a native of South America and the West Indies, cultivated in warm, temperate, and sub-tropical countries as an ornamental shrub. All parts of the plant are poisonous, and on this account the shrub is a dangerous one to have growing where there are young children.

Tree Groundsel.

A.M.R. (D'Aguilar)—

Your specimen forwarded is *Baccharis halimifolia*, the Tree Groundsel. An article on this plant was published in this Journal for July, 1923. The plant is a very strong grower, and on this account we are doubtful about the efficacy of arsenical sprays, though, if repeated several times, it may be killed. Grubbing out the bushes seems to be the only satisfactory method of extermination.

Leopard Flower—Wild Marjoram.

G.H.J. (South Brisbane)—

Your specimen is *Bellancanda chinensis*, or sometimes known as *Pardanthus chinensis*, the Leopard Flower, a tall-growing plant of the Iris family—Iridaceæ—a native of China.

The other plant you refer to is *Ocimum sanctum*, sometimes known in North Queensland as Wild Marjoram, and used by bushmen as a tonic, being taken in the form of a tea. This plant is fairly common in parts of the Gulf country, but the handiest place we have it recorded for in quantity is Charters Towers and it is said to be fairly common there. If you know any chemist at Charters Towers he should be able to put you in the way of getting a fair supply at the present time. It is a Labiate, about 2 feet high, the leaves rather greyish-green, with a strong "labiate" smell.

Central Queensland Plants Identified.

M.L.F. (Dalma, via Rockhampton)—

1. *Sterculia rupestris*, the Bottle Tree.
2. *Sterculia trichosiphon*, the broad-leaved Bottle Tree. This is sometimes called Kurrajong in Central Queensland, though the name Kurrajong, strictly speaking, belongs to another and closely related tree.
3. *Setaria macrostachya*, Scrub Panicum.
4. *Ajuga australis*, Australian Bugle.
5. *Hibiscus trionum*, the Bladder Ketmia. This is a native species of Hibiscus, widely spread over the warm temperate parts of the world. It is very common in some parts of Western Queensland on the black soil plains. It is rather a pretty little plant in flower.
6. *Indigofera hirsuta*, Hairy Indigo. Sometimes called Wild Lucerne, but this is a name applied to several leguminous plants in Queensland.

We shall always be pleased to name and report on any specimens or plants you care to send. The local names in use in your district are very acceptable.

Batswing Coral—Honey Locust.

S.R. (Maryborough)—

1. *Erythrina verpertillia*, the Batswing Coral, so called owing to the shape of the leaflets. It is a native tree with a wide distribution in Queensland, occurring both on the coast and inland. The bark is thick and corky and the wood is exceptionally light, hence the tree is often known as Corkwood. This name, however, is applied to a number of trees in Queensland with rather light woods and soft, corky barks.
2. *Gleditschia triacanthos*, the Honey Locust. A native of North America, much planted in temperate and sub-tropical countries as an ornamental tree. The large pods it yields have considerable value as fodder for stock. The flowers have considerable value for honey-producing purposes.

Love-in-a-Mist Passion Vine—Cockatoo Apple—A Native Grape Vine.

W.M.P. (Murray's Creek, N.C.L.)—

1. *Passiflora foetida*, Love-in-a-mist Passion Vine. A native of South America, now widely spread over the tropics and sub-tropics of the world. The ripe fruits are often eaten by children, but when unripe they are dangerous as they contain a prussic acid-yielding glucoside. The plant has been widely cultivated in tropical countries as a green manure and smother crop, being largely grown in some tropical places under rubber trees to smother out more vigorous and rank-growing weeds.
2. *Careya australis*, the Cockatoo Apple. This plant is very common in coastal Queensland from Wide Bay northwards, and extends up to New Guinea. It has been looked upon as harbouring the fruit fly, but the fly contained in it is a different one from the species that infests cultivated fruits. You call it Kangaroo Apple. This name more correctly belongs to another plant—*Solanum aviculare*—but local names change a good deal according to the district.
3. *Vitis opaca*, a native Grape Vine. The roots sometimes form large underground tubers, but we do not know if these have any food value.

Cassia and India Rubber Vine.

F.R.D. (Barcaldine)—

The shrub is *Cassia notabilis*, a plant of the Senna family. It is not known to be poisonous to stock, but they do not seem to eat it. If they did, like others of the same genus, it would probably be a purgative. The present species has not come under notice as a pest, but many Cassias are capable of overrunning the country if left unchecked. We previously received specimens of this plant from you in the spring of 1927.

The plant with the curious double seed-pod is *Cryptostegia grandiflora*, an india-rubber vine. A pamphlet on it has been forwarded.

Burr Vine.

H.P. (Stanthorpe)—

The specimen is *Carissa ovata*, commonly known in Western Queensland as a Burr Vine; not a particularly good name, as the plant is hardly a vine but a shrub. Berry Bush is another name applied to it. It has some reputation as a fodder in spite of its thorny nature. It should be possible to grow it in the Stanthorpe district, but in its natural state it generally seeks the shelter of native scrub. The plant is propagated from seeds, which, if we remember rightly, set some time in the winter months.

PIG RAISING.

From the outgoing mail of the Instructor in Pig Raising, Mr. E. J. Shelton.

Sick Pigs.

E.B. (Mallanganee, N.S.W.)—

The pigs are suffering from infection by stomach and intestinal worms, as well as from severe indigestion and malnutrition, all the result of improper feeding, and by exposure.

The fact that these pigs do very well until they are about three months of age shows that this is the period during which they receive a liberal supply of natural food from the sow, but when this supply is cut off and the diet is changed, indigestion is set up and the resultant disorders check growth and produce the pot-bellied, slow-growing stock to which you refer.

These matters are treated very fully in a number of pamphlets we are posting to you under separate cover, so we need not refer to them fully here, but would add that every effort should be made to accustom the young pigs before weaning to the same class of food as that on which they will have to depend after weaning. If this is done there will not be any serious check in growth at weaning time.

Infestation by these worms results from the young pigs picking up the worm eggs while suckling; the worms develop rapidly in the young animal and soon cause a serious check in development. See reference to treatment in pamphlet on "Paralysis in the Hindquarters." See also leaflet "Diarrhœa or White Scour in Young Pigs," for this treats also on constipation, from which it is evident your pigs are suffering.

We strongly recommend you to try some protein meal and some bone meal and lime water in the food given to these young pigs and see also that they have their food in a quiet corner where they can feed without disturbance by older stock, as they are too young to be able to successfully fight against older stock in the rush for food. Succulent greens and an abundant supply of clean drinking water are essential to the rearing of young pigs, while balanced rations only should be fed. See pamphlets also for treatment of skin parasites, for it is possible the young pigs may be infested with hog lice.

Pig Standards.

P.G.R. (Goodger, Nanango Railway)—

At the several meetings of the Queensland Pig Industry Committee the matter of a standard carcase of pig most suitable for the local bacon trade has been dealt with

The ideal bacon pig as required by factories and the trade in this State is a prime quality, medium condition, fleshy animal not exceeding six months of age and from 95 to 120 lb. weight dressed, approximately 136 to 170 lb. live weight. There is no market for very heavy, fat pigs or for pigs in an overfat condition even if they are of correct weight and type. Hence the greatest care must be taken in having bacon pigs in prime condition and not over the specified weights.

From the copy of the February issue of the "Queensland Agricultural Journal" forwarded with other pamphlets under separate cover, you will note the scale of weights and current prices being paid for bacon pigs in this State and remarks thereon, and we hope you will bring these matters before your members and urge all those who are not already subscribers to the "Queensland Agricultural Journal" to send along their shillings (it costs the farmer only a shilling a year for postage) and have the Journal posted regularly. Copies of the article dealing with the Economic Phases of the Pig Industry are being sent to every known pig producer through the various butter factory organisations, but if any of your members are not dairying and should like a copy of the pamphlet, we shall be glad to supply it.

Bacon Curing on the Farm.

L.P.A. (Bouldercombe, Rockhampton)—

The secrets of success in the curing of bacon are:—

(1) The correct weight, type and condition of the bacon pig.
(2) Correct preparation for slaughter by restricting the feeding and resting the animal twenty-four hours beforehand.
(3) Absolute cleanliness and complete control of temperature throughout the process of curing.

The reason the factories can successfully cure bacon and ham without the necessity of removing the shoulderblade and opening up the stifle joint in the ham is that they are able to thoroughly chill the carcase after having allowed the animal heat to pass off. They also have complete control of the temperature both day and night, week in and week out, and can thus keep the meat in temperature of around 42 degrees Fahr. during the whole of the time it is in the curing cellars. They also have proper rooms for thoroughly drying the meat preparatory to and for smoking after the drying process is complete.

The trouble with curing bacon on the farm, especially in warm climates, is that the temperature varies so much from day to day and from morning to evening that it is not possible to check decomposition to the same extent as it is where continuously low temperatures prevail, as they do in the factory cool rooms. We doubt very much whether it pays farmers to attempt the curing of their own bacon, unless they have specially constructed cellars or rooms where there is a continuous draft of cold moist air, for moisture is as essential to success as low temperature.

If your members clubbed together and sent in a consignment of suitable pigs to the bacon factory either at Rockhampton or Maryborough or other centre, we feel sure the factory management would willingly undertake at your risk the curing and final delivery of the products of these pigs, charging working expenses only on the consignment; at any rate it would be worth enquiring into. You will realise the factory people are not very keen on the matter of curing for individual shareholders as it means too much expense in handling each man's bacon and they do not consider the resultant bacon would be any better than the average bacon, ham, etc., manufactured at their factory and which is available to shareholders at wholesale rates in sides, flitches, middles or hams.

We shall be glad to advise you fully on any other points on which your members require detailed advice.

Salt, sugar, and saltpetre are the best perservatives to use in the curing of bacon. The use of boric acid or commercial preservatives is not generally recommended; in fact, for British markets and oversea trade the use of preservatives like boric acid is strictly prohibited. Preservatives like this will not check decomposition unless the temperature of the room in which the meat is cured (or of the brine) is low enough; in fact, they are only of value under conditions favourable to the curing of bacon without the addition of these acids.

Sunflower Seed for Pigs.

"Inquirer" (Brisbane)—

Regarding the use of sunflower seed as a food for pigs, and our suggestion that a very limited proportion of seed—2 per cent. or so—should be added to the ration, it might be as well to point out that a larger proportion of seed, up to 10 per cent., could be used without materially affecting the growth of the young stock. Both the seed and the plant itself are looked upon by authorities here and in other parts of the world as of lower food value than maize, or the better grades of sorghum, and it is quite apparent that it would not pay to grow sunflowers specially for stock feeding purposes. One American report indicates that equal parts of corn and sunflower seed were fed to pigs in conjunction with other foods with good results, but there does not appear to be any clear indication as to the nature of the other foods or the relative proportion. Another report states that sunflower seed may be classified as of similar value to linseed, but here, again, it is very doubtful whether it would pay to grow linseed as a stock food unless the grower was prepared to experiment and take his chance with the results. In his "Stock Foods" pamphlet, Mr. Brunnich, the Agricultural Chemist, states that sunflower seeds and sunflower oil cake, if procurable, are excellent foods suitable for all kinds of stock.

General Notes.

Examinations under "The y Produce Act of 1920."

July 13th has been fixed for the holding of the annual examinations in the theory of Milk and Cream Testing, Milk and Cream Grading, and Butter and Cheese Making. These examinations were held previously during the months of October or November.

Watering Horses.

Horses require anything from 5 to 15 gallons of water a day, the quantity depending on the temperature and the amount of work performed. The water should be as pure as possible, clear in appearance, and free from taste, colour, or smell.

Pure water is just as essential to a horse as it is to a man, and it is a mistake to suppose that a horse can drink badly-contaminated water with impunity. Water obtained from pools or shallow wells, contaminated with surface drainage, or containing decomposing organic matter, frequently causes diarrhœa, and generally predisposes to colic. Water that contains a large amount of sediment should not be given, as the sediment causes a mechanical irritation of the mucous membrane of the stomach and intestines—i.e., sand colic. When the horse is at rest in the stable, water should be given three times a day, and should invariably be given previous to feeding.

Staff Changes and Appointments.

The following appointments have been made in the Agricultural Bank:—

Mr. E. W. Everett, Inspector, to be Senior Inspector, and the undermentioned Inspectors to be District Inspectors:—Messrs. A. Harrison, J. F. Smith, G. H. B. Watson, W. S. Robinson, R. J. Calder, C. S. Ross, and E. W. Wanstall.

These appointments will take effect as from 1st May, 1929.

The appointments of Messrs. S. A. Green and D. McLaurin as Inspectors under the Diseases in Plants Acts have been confirmed as from 1st November, 1928.

The appointments of Messrs. S. G. Allan and J. A. Kerr as Inspectors under the Diseases in Stock Act have been confirmed as from 30th October, 1928.

The appointment of Mr. F. C. Coleman as Inspector under the Dairy Produce Act has been confirmed as from 15th October, 1928.

Mr. F. C. Shaw has been appointed Temporary Inspector of Stock, Maryborough, from 2nd April, 1929, to 27th April, 1929.

The resignation of Mr. L. L. Gudge, as Cotton Classer and Salesman, as from the 6th March, 1929, has been accepted as tendered.

Honey Board Election.

The first election in connection with the appointment of four growers' representatives on the newly constituted Honey Board resulted as follows:—

	Votes.
H. E. Fagg, Killarney South	222
E. Pickering, Eumundi	210
R. V. Woodrow, Woodford	200
J. Schutt, Holstein Park, via Dalby	179
H. L. Jones, Goodna	168
A. Gambling, Raceview, via Ipswich	82
H. E. Golder, Milmerran	74
J. T. Biggs, Caboolture	64
J. M. Petersen, Morayfield	64
M. Peake, The Gap	42
A. F. Spry, Clayfield	30
C. F. Spry, Rocklea	24

Messrs. Fagg, Pickering, Woodrow, and Schutt, together with the Director of Marketing, will therefore be appointed members of the Board, and will hold office for a term of one year.

Wheat Board Referendum.

A poll to decide whether the State Wheat Board should be brought under the provisions of "*The Primary Producers' Organisation and Marketing Acts, 1926 to 1928,*" or remain as at present under "*The Wheat Pool Acts, 1920 to 1925,*" was conducted on the 22nd April. The voting was as follows:—

For the proposal to declare wheat a commodity under the Primary Producers' Organisation and Marketing Acts	622 votes.
Against the proposal to declare wheat a commodity under the Primary Prducers' Organisation and Marketing Acts	867 votes.

The proposal will consequently lapse.

"ABC of Queensland and Australian Statistics."

The Registrar-General (Mr. Geo. Porter) has forwarded us a copy of the 1929 Edition of his "ABC of Queensland and Australian Statistics." This book contains a wealth of statistical and other information, but at the same time is of a handy size and easily carried in the pocket.

Besides presenting statistical facts in an interesting and useful form, it contains much general information which will prove useful to almost any class of person. For instance, there are among other things Location of Public Offices; Consular Representatives; Registrar-General and Registrar of Friendly Societies' Fees; Public Curator Fees; Fees under Real Property Act; State Duties; License Fees (State and Federal) including Customs, Fishing, Timber, Traffic, Wireless, Wine, Beer, and Spirits, and others; Company, Shop and Factory Registration Fees; Federal and State taxation information; Main Roads Regulations and Fees; Post Office Charges, &c.

New statistical features have been added this year touching on topics of general interest, such as—Area, Yield and Value of Australian Fruit Production, Oversea Trade, Value of Production, Greater Brisbane Finance, Oil Boring Companies, Industrial Accidents, Membership of Industrial Organisations, Unemployment, Census Population and Expectation of Life. At the same time the volume retains all of the features incorporated in previous issues, and all figures quoted were the latest available at time of going to press. A map and geography of Queensland, a graph showing Principal Agricultural Yields, and information concerning world population and products are included, besides Statistical Tables giving facts concerning Agriculture, Live Stock, Land Settlement and Tenure, Banking, Building, Local Government, Manufacturing, Retail and Wholesale Prices, Cost of Living, Purchasing Power of Money, Rates of Wages, Industrial Courts, Industrial Disputes, Education, Election Results, Public Finance, Taxation, Friendly Societies, Hospitals, Life Insurance, Law and Crime, Local Option Polls, Meteorology, Mineral Production, State Enterprises, Trade, Shipping, Motor Vehicles, Post and Telegraphs, Wireless, Railways and Tramways, Traffic Accidents, Births, Deaths, Marriages, Divorces, Infant Mortality, Population, and Migration. This book should be of real interest to all.

Wheat-growing Competitions—Factors in Increased Yields.

Frequent and judicious working of the fallows, coupled with liberal use of graded seed and superphosphate, are the factors largely contributing to the increased yields in the various crop competitions in the Parkes (N.S.W.) and adjacent centres, according to the judges' summarised report.

In 1926, it is stated, the fallows producing the leading seven crops and the twelve supplementary crops were worked 6.6 and 4.75 times, respectively, an increase of 1.85. In 1927, the times worked were 8.4 and 4.9, an increase of 3.5 times, and this year (1928) 9 and 6.6 times, an increase of 2.4 times. The average number of workings in 1928 was greater than in 1927 or 1926.

The use of superphosphate shows a continued increase, the amount being 73 lb. per acre, for the leading seven crops of 1928. There has been no increase in the amount of seed sown, which is still about 1 bushel per acre.

It is noticeable, remark the judges, that diseases are becoming less menacing under scientific farming. In the central-western district this year flag smut was the only disease at all prominent. Foot rot and take-all were not much in evidence, while copper carbonate has effectively controlled bunt. Almost without exception this season the seed was treated with copper carbonate. How this treatment of seed wheat has grown in favour in recent years is well demonstrated by statistical records, which show that in 1924 only 40 per cent. of the competition crops were so treated, while in 1928 the percentage had increased to 97.

Egg Board Levy.

Regulations have received approval under "*The Primary Producers' Organisation and Marketing Acts, 1926 to 1928,*" empowering the Egg Board to make a levy on all persons delivering eggs to such Board, the levy to be at the rate of ½d. per dozen eggs so delivered as from 1st January, 1929, to 31st December, 1933. This levy is to be used by the Egg Board for administrative purposes.

Getting Land Ready for Fruit Trees.

Preparation of the land for planting of fruit trees should be painstaking and thorough. Ploughing must be to a sufficient depth, sufficiently depending upon the nature and depth of the soil and the nature of the subsoil. The soil should be thoroughly broken up, and allowed to remain in the rough, so that, exposed to the beneficial influences of sun, rain, air, and frost, it may be sweetened and improved in its chemical content, and so that it may absorb and hold the winter rains. Later, as a result of the influences referred to, it will respond to the orchardist's efforts to induce a good tilth.

In localities where autumn is mild and frosts during that season are unknown, citrus trees may be planted during the month of April. Injury to roots and the drying of the roots during the process of planting should be avoided. It will be necessary to water newly-planted trees in dry soil, thus helping them over the critical period of establishment in their new position. Loss of soil moisture is lessened by the beneficial process of mulching. Do not place undecomposed manure in contact with the roots. Manure, if used at the time of planting, should be thoroughly mixed with the soil. When refills are being planted a large hole should be dug and filled with fresh soil.

Common Cream Defects—Causes and Remedies.

How to guard against the defects commonly found in cream is a matter of considerable financial importance to the dairy farmer. In the following paragraphs are discussed a few of such common faults, their causes and remedies.

Over-ripe Cream.—This is caused by the cream developing excess acidity, by skimming cream too thin, or by infrequent deliveries to the factory. Do not skim cream below 40 per cent. test in spring and summer, or below 36 per cent. test in autumn and winter. Cool and ærate cream on the farm. Deliver to the factory frequently—not less than four times weekly.

Staleness.—Caused by holding cream too long at the dairy. Often the balance after filling the cream can is held until the next delivery, and held at too high a temperature. The remedies are to send all the cream in the dairy on days of delivery, and to keep creams cool while on the farm.

Ropy Cream.—Due chiefly to bacteria in water supplies, especially in swamps, stagnant dams, &c.; also due to unclean, dusty yards and bails, dairies and utensils. Cows should be prevented from wading in stagnant waters, and the udders of the cows should be washed and wiped before milking. Premises and utensils should be kept clean. This defect is very difficult to overcome, unless clean methods generally are adopted in dairy work. Use soda when washing utensils, and boiling water to scald all utensils. At least once a day remove all cow droppings 100 feet from dairy, yards, and bails.

Curdy Cream.—Due to skimming cream too thin, to keeping cream at high temperatures, or to adding warm cream to cool cream. Skim cream from 38 per cent. to 42 per cent. fat test. Keep cream cool. Mix warm cream with cool cream only after animal heat has been reduced; give the whole an occasional stir to make the mass uniform, and stir at least four times daily.

Fermented Cream.—Due to the development of bacteria, mostly the result of unclean methods in dairy work. To remedy the condition give strict attention to cleanliness in plant and premises, using boiling water mornings and evenings, and see that the udders of the cows and the hands of milkers are washed. Skim the cream not less than 38 per cent. test, and mix creams only at cool temperatures.

Cowy Flavour.—Due to unclean condition of bails and yards, especially in wet weather; also to milking unhealthy cows, and milking cows too soon after calving. Cleanliness of bails and yards should be the order of the day. Never use milk from sick cows, or from cows too soon after calving.

Rancid Cream.—Due to over-staleness, the result of not delivering to the factory frequently enough. This class of cream is liable to be condemned, being unfit to manufacture into butter. Cleanliness must be observed, with frequent delivery to the factory.

Clean up of Vegetable Plots.

Clean cultivation is of considerable significance in the combat of the various pests of field, garden, and orchard.

It is an important factory in the control of cabbage moth, for instance, and one that cannot be too strongly emphasised. It is often the practice to leave all unsaleable cabbages or cauliflowers, or the stumps from which the "heads" have been cut, in the ground long after the crop has been harvested. This provides a continuous breeding ground for the moths, which infest the young plants as soon as they are put out—very often alongside the abandoned plot. All useless plants and stumps should, therefore, be cleaned up and properly destroyed as soon as the crop is harvested.

The same reminder may be given with respect to the pumpkin beetle, a pest so prevalent this season. A few years ago it was discovered that the larvæ of this beetle infest the roots of pumpkins. All dead pumpkin and melon plants, therefore, should be cleaned up and burnt.

The Royal Society of Queensland—Report of Council for 1928.

Thirteen original papers were read before the Society and published during the year. Three public meetings were held. On 10th July, 1928, Dr. C. M. Yonge, leader of the Great Barrier Reef Expedition, Dr. Stephenson, and Messrs. Tandy and Russell outlined the work contemplated. On 16th July, 1928, Sir Arnold Theiler gave an address on "Problems of Phosphorus Deficiency of Stock." On 4th March, 1929, Professor Johannes Schmidt, D.Sc., Ph.D., Director of the Carlsberg Laboratory, Copenhagen, and leader of the Danish Oceanographical Expedition, delivered a lecture on the life history of the eel.

The Council wishes to acknowledge generous subsidies amounting to £147 from the Queensland Government towards the cost of printing the Proceedings of the Society. Appreciative acknowledgment is also made to the University of Queensland for housing the library and providing accommodation for meetings.

The membership roll consists of 4 corresponding members, 6 life members, and 176 ordinary members. During the year there were five resignations, and nine new members were elected. The deaths of Dr. J. V. Danes, of the Czech University, Prague, a corresponding member, and of Mr. W. R. Colledge, a past president of the Society and a frequent contributor to the proceedings, are reported with regret. Mr. Rowland Illidge, a former honorary librarian of the Society, has been lost from the ranks of Queensland biologists by death.

Green Coloration in Wool—Investigations into Cause.

Though distinctly uncommon, it is not a very rare thing to see wool which shows a greenish discoloration, and at times a reddish coloration has been observed. The discoloration may affect the whole length of the staple or only part, and sometimes may occur as bands across the staple (states an article in the "Agricultural Gazette" of New South Wales). It is said to be most commonly met with in wool from the tablelands, and it is understood that the wool is looked upon unfavourably by buyers owing to the colour remaining steadfast after scouring.

Recently a sample from the Monaro district was submitted to Glenfield Veterinary Research Station for examination, and as a result it was possible to confirm a previous observation that the production of colour was due to the growth of a pigment-producing bacterium. Not only was the bacterium readily cultivated from the sample in question, but the condition has been reproduced experimentally on the back of sheep.

It was found that the bacterium in question requires a considerable amount of moisture for its growth, and appears to grow better on fine than on coarse wool. When very old, the colour turns a brownish red, but the green colour can be restored by the addition of alkali, and, conversely, the green colour becomes red on the addition of acid. It would thus appear that if there happens to be an acid-producing organism, the wool may take on a red colour. Thus both types of discoloration may be induced by the growth of the same organisms.

The green-producing bacterium is not a very uncommon organism, and at times gets into wounds, probably from dust. It would seem, therefore, that if it gets a lodgment on the skin of a sheep and the conditions are suitable for its growth, that is, if the skin is scurfy and there is sufficient moisture, it may lead to this discoloration of the wool. Such conditions might well exist at times in tableland country with heavy rainfall, and it is to be noted that it is said that the condition is seen chiefly in sheep from such localities.

A Southern Dairy Farm Competition—Points from the Report.

In inaugurating a dairy farm competition the Murrumbidgee Pastoral and Agricultural Association was responsible for something in the nature of an innovation in the dairying industry. Seven farms were submitted for judging, points being awarded under a schedule, the main headings of which were conservation of fodder, character of the herd, and layout of the dairy and farm. Mr. A. R. Martin, whose farm is situated on the Murrumbidgee River, about 12 miles west of Wagga, was the winner, scoring 1,115 points out of a possible 1,250. The following notes, which should be of interest to others besides those competing, are taken from the judge's report.

With reference to fodder conservation (the importance of which was so generally recognised by competitors that the average score was 230 points out of a possible 300), it is remarked that if full returns are to be obtained from dairy cows they must be well fed during the whole of the lactation period—that is, usually for about nine months after calving. If feed is scarce at any time during that period, the milk flow, and consequently the factory cheque, will decrease. In no part of New South Wales are the natural pastures sufficient for nine months on end, so that the growing of crops and the conservation of fodder are necessary if full returns are to be obtained from dairying.

The ideal fodder for dairy cows consists of a mixture of grasses and clovers in bloom, such as is found in the Wagga district in late winter and spring. This provides naturally a balanced ration; that is, one in which the different ingredients are in the proportions which can be most economically made use of by the cow. The ingredients referred to are protein, the flesh-forming substance, and carbohydrates and fat, which provide heat and energy. Protein is the most expensive ingredient of food to provide, the value of a fodder usually being judged by the quantity of protein it contains. In this respect the Wagga district is fortunate in that the basis of feeding on nearly all farms is lucerne, which contains more protein than any other common fodder.

Lucerne alone, however, does not provide a balanced ration, being deficient in carbohydrates, and it therefore requires mixing with fodder rich in carbohydrates, and the cheapest and most plentiful fodder of that nature in this district is oaten or wheaten hay or chaff. For example, if a cow were fed a ration of 30 lb. lucerne hay or 30 lb. oaten hay per day, in neither case would a balanced ration be provided, too much of certain ingredients being supplied and not enough of others. The yield therefore would suffer. But if a mixture of 15 lb. lucerne and 15 lb. oaten hay or chaff were fed a fairly well-balanced ration would be provided. This is a matter that is not very well understood, there being a tendency to feed only one fodder at a time.

The owners of all competing farms were impressed with the necessity for improving pastures, mainly by top-dressing, and to a lesser extent by the sowing of improved pasture plants, such as subterranean clover and rye grass, proceeds the report. Of green crops, lucerne, of course, always has pride of place, but many areas of Sudan grass were seen to be suffering severely from the dry weather and in some cases germination was very patchy. This makes one wonder why dairy farmers do not go to the trouble of fallowing a small area for summer fodder each year. Sudan grass is a valuable fodder, but it cannot be sown until the ground is warm, and when sown on freshly ploughed ground in a dry spring is bound to suffer severely.

As to the herds, farmers generally are stated to be keen to develop them along the right lines. The importance of a purebred bull is realised, but it is still more important, it is pointed out, that he have behind him a record for production which he will transmit to his daughters—the herd of the future. Unfortunately there are many purebred bulls whose presence in the herd is more likely to have a deteriorating than an improving effect on butter production. Unless the sire of the herd comes from tested stock whose records are known, there is no certainty that his progeny will be better than their parents as dairy animals.

If you like the "Journal," kindly bring it under the notice of your neighbours who are not already subscribers. To farmers it is free and the annual charge of one shilling is merely to cover postage for the twelve months.

The Home and the Garden.

OUR BABIES.

Under this heading a series of short articles by the Medical and Nursing Staff of the Queensland Baby Clinics, dealing with the welfare and care of babies, has been planned in the hope of increasing their health and happiness and decreasing the number of avoidable cases of infant mortality.

What should Baby Weigh.

What should baby weigh? The answer to this question, so often asked by mothers, depends on many factors besides baby's age. The mother is prone to base her idea of what her child should weigh on the weight of a friend's or neighbour's baby, and she not infrequently thinks that her own infant suffers by the comparison. Because her baby is smaller, the opinion is formed that he cannot be getting sufficient food, or, what is worse, that her milk is not agreeing with him. In her anxiety that he should thrive, the mother is tempted to wean him, and give him some artificial food. Perhaps, unconsciously, her mind has been influenced by frequently seen glowing advertisements of patent foods, accompanied by photographs of big, fat babies, and the anxious mother thinks that the food which produced such results in other children must also be good for her baby. What she does not realise is that patent food-fed babies, though often very fat and heavy, are frequently flabby, and in other respects not as healthy as the child who is fed by his mother. So her baby is weaned, and deprived of the food which, above all others in the world, is best for him.

Only too often serious digestive upset follows, especially if the weaning is done during the summer months, when there is the risk, not only of upset due to changing the food, but also the danger of infection with dysentery, which occurs every summer in Queensland.

In judging what a baby should weigh, consideration should be given to more than merely weight for age. A little knowledge of some of the factors to be taken into account may save some mothers from anxiety, and some babies from being robbed of their mothers' milk.

The average baby, at birth, weighs 7 lb.; boys usually weigh a little more than girls. During the first week of life there is almost always a loss in weight, but by the time baby is a fortnight old, he has, as a rule, regained his birth weight. Sometimes it takes a little longer—perhaps three or four weeks—for him to regain this weight, and if this happens it need not cause anxiety if the infant appears well. But, at any rate, at the end of a month, the baby who fails to gain weight must be taken to a doctor or a welfare nurse. It may be that baby is getting insufficient food, or too much food, in which case the nurse will be able to help or advise, but some infants need medical attention. The average healthy baby at the end of a fortnight has regained his birth weight, and from this time on he should make steady progress. In the first three months he gains weight more rapidly than at any later period in the first year. His gain should be from 4 to 8 oz. each week. By the time he is three months old this rapid gain is slowing down a little, and the average gain for the next three months is from 4 to 6 oz. weekly. When baby is from five to six months old, he has doubled his birth weight. After that time there is again a slowing down, and from then until he is twelve months old the gain is about 1 lb. a month. At twelve months the birth weight is usually trebled, and the child weighs about 20 or 21 lb.

All these figures apply to the average normal baby, but every baby must not be expected to conform to them. There are exceptions, even among seemingly normal babies, and those who obviously differ from normal must be expected to differ from normal standard.

Take, for example, the baby who is under weight at birth. The infant who weighs, say, only five pounds, cannot be expected to gain as much weekly weight as the one who was seven pounds when born. A smaller gain would, in this case, be perfectly normal, and quite satisfactory. Baby started life weighing two pounds less than usual, and, though thriving, may throughout the first year remain so much below average weight; though sometimes these children gain more than usual in the latter part of the year, and by the time they are twelve months old reach normal weight.

Similarly, the baby who weighs nine or ten pounds at birth may continue above average weight for a time, but later the weekly gain will probably be less than usual, and this child also at twelve months tends to reach the average of twenty to twenty-one pounds.

The child of very small parents would naturally be small framed, and consequently, throughout the first year and later, tend to weigh less than normal.

The child who is fed on his mother's milk is most likely, other things being equal, to make uninterrupted and regular gain. The bottle-fed baby, if weened when very young, as a rule gains weight slowly at first. Even when fed on the proper quantity of a good artificial food, the digestion has to become accustomed to the strange food, which could not be expected to suit it as well as mother's milk.

Overfeeding will cause a baby to gain weight rapidly for a time, but this is frequently followed by indigestion, which later may cause failure to gain, or even loss of weight. Mothers should guard against giving extra food merely with a view to increasing the baby's weight. In addition to the risk of causing indigestion, and general upset, there are other disadvantages. The baby who is "out of sorts" from indigestion is much more likely to contract infection than the healthy infant. Also, the very heavy baby does not sit up, crawl, or walk as early as the average child, and consequently needs more attention for a longer period.

Temporary mild indisposition, for example, a common cold, may be responsible for failure to gain weight for a week or so. It is often noticed that baby does not gain just when a tooth is being cut, when changing from one food to another, or during weaning. Some babies gain unequally; that is, they may gain more than the average one week, and not at all the next. This need cause no anxiety. Steady, regular weekly gain is best, but there is no need to worry over some irregularity in gain, as long as baby looks well, is happy and contented, and is sleeping well at night.

The important thing for baby, during his first nine months, is not that he should weigh more than usual, but that he should make steady gain, when fed on his mother's milk. So treated, he has the best chance of being strong and healthy, not only during his first year, but also during subsequent years.

THE HOME BEAUTIFUL.

BRIGHTEN THE HOUSE WITH COLOUR AND INCREASE EVERYONE'S HAPPINESS.

Surely in these modern days there is no woman that does not wish to make her home more beautiful. Since few of us can afford entirely to refurnish our homes or even a single room, it comes as welcome news that any shabby, out-of-date room, can be transformed into real loveliness by simple methods and small expenditure.

In answer to a mood of new things, or a desire that your house should look at its best, all you need is to start beautifying something, anything, that you already have.

Bring colour into your home and the shabbiest and most commonplace surroundings will create a very different impression. Colour, new arrangements, and thought given to detail will beautify any house that appears drab and has become out of date—and without discarding existing furniture. Colour is cheap, offering itself in cretonnes, plain stuffs of gay colours, and most inexpensively in the brushing laquers that are now obtainable. New arrangements are cheap, too, for it costs nothing to try table, chairs, and sofa in a new cosy grouping or experiment with a different placing of the bedroom pieces.

Of course, the smartness of freshly tinted walls plays an important part in the quick and cheap transformation of any room, but there is nothing like a new floor-covering to add charm to some shabby room. Indulge in a colourful rug or lino square and lacquer the floor surrounds and skirtings with a colour to tone in. Then with the right window treatment—perhaps the old curtains dyed to the correct shade—and you have gone a long way towards gaining a maximum effect at a very moderate cost.

How about the furniture and the little things that mean such a lot in the general colour scheme? It is here that the modern brushing lacquers present

such wonderful opportunities for the woman with ideas. The "wet paint" bogey need no longer frighten you, or the lack of painting experience cause you to hesitate, for these lacquers dry while you are admiring what you have done and go on so smoothly that there are no ripples or marks of the brush in the finish, even though it may be your first painting job.

Picture the old bedroom furniture in a new coating of pale green, shell grey, or a delicate pink, a pretty lamp shade quickly made, a gay rug, and the cushions recovered. Very little expense, but a veritable picture of daintiness. Bathroom fittings of jade or turquoise in place of the white we have seen so long, and dozens of ideas for bringing colour beauty into the home that pop into your mind directly you think of it. To mention specific colour schemes is unnecessary, for every woman possesses a latent talent for using colour to its best advantage and the great charm of home decoration is to introduce individuality into every room.

Possibly the kitchen gives the greatest scope for showing what can be done, and it is only fitting for the joy of colour to smile back at you in the place you spend so much of your time. Why endure scratched or plain hungry wood that requires so much scrubbing when it can so easily be lacquered and made easy to keep clean. Let the chairs, table, dresser, draining-board, cupboard, and woodwork radiate with cheery colours and create an atmosphere that will banish the air of drudgery so often apparent in the kitchen. The bread crock, tea-tray, canisters, and the many articles of everyday use, right down to the dustpan, can be artistically decorated and help the general impression of brightness.

When you have seen what the magic of colour has done for the kitchen, go through each room, adding the touch of colour you know should be there, and you will find that this business of cheering up your home with colour is not only an easy way to achieve permanent loveliness, but that it is great fun as well.—"The Farmer and Settler."

WHY NOT ELEVATE THE KITCHEN.

"There is nothing wrong with labour-saving or with matters connected with the home; the whole history of civilisation has been built up by the food we eat and might well be written from that aspect. Archestrates realised this in Ancient Greece, and his lost epic on the subject is considered by learned men and women one of the greatest losses learning and civilisation have suffered. Household equipment in the same way has formed the starting-point of many a modern scientific invention. Watts' steam kettle is a well-known instance; there are very many less known, or still unnoticed. We ought to try to raise the interests of home-workers instead of keeping them in the condition of unlettered, unambitious slavery. The status of domestic work in this country is a disgrace to the emancipation of women. Only a certain section of women has been freed from slavery, and I am often tempted to think those who have thus freed themselves are unwilling to emancipate the home workers because they want to keep their services in the home for themselves, so that they, the emancipated, may be free to devote themselves to higher interests. This is exactly the attitude of men in 1850. The truth is all work, whether in the home or outside, may be degraded or elevated according to the amount of intellect, moral effort, and spiritual or scientific significance, applied to it."—Ann Pope, in "The Woman's Leader."

CREATIVE GARDENING.

Gardening is a pleasant pastime, but do not overburden yourself by attempting to cultivate too large a garden. Immediately you do this your work becomes a drudgery and the charm is lost. To take a plot of ground, barren it may be, rough, and rugged, and neglected, a mere weedy waste without form in design or any attractive features whatever, and to convert it into a little world of beauty and fertility is one of the most delightful achievements it is possible to attempt.

"Pictorial Gardening" says: "It is delightful, because in the best sense of the word it is natural. There is something in the very breath of the soil that gives tone and health to the body and mind. There is wholesome inspiration in the feeling that in labouring to bring out in your ground the utmost beauty of which it is capable you are working in immediate co-operation with sunbeams and breezes and showers, and with that beneficent power behind them which seems always to be striving everywhere to clothe the whole world with what is lovely and productive.

"To work out under the open sky, amid sunbeams, and winds, turf, and flowers, and twittering birds, and to fall into line with the principles of life that nature is

everywhere illustrating and enforcing around you, can hardly fail every now and again to bring you very near in thought and feeling to the Creative Power throbbing and pulsing in every blade and leaf about you.

"As you go on your love of all that is fair and beautiful in the natural world around you will increase, and if you are tolerably easy in mind, simple and natural in your tastes, and have a very moderate endowment of the imaginative, then the hours in your garden will not only be amongst the most delightful of your life, but in the best sense they will also be amongst the most profitable, benefiting the very nature of you."

KITCHEN GARDEN.

Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well-prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted; and in cool districts horse radish can be set out.

The earlier sowings of all root crops should now be ready to thin out, if this has not been already attended to.

Keep down the weeds among the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

FLOWER GARDEN.

No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool, moist spring-time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses; and tie up, without pruning, to trellis or stakes the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow first lots, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground. Many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondi*, stocks, wallflower and zinnias, &c., may be sown either in boxes or open beds. Mignonette is best sown where it is intended to remain. Dahlia roots may be taken up and placed in a shady situation out of doors, plant bulbs such as anemones, ranunculus, fresias, snowflakes, ixias, watsonias, iris, narcissus, daffodil, &c. The Queensland climate is not suitable for tulips.

To grow these plants successfully it is only necessary to thoroughly dig the ground over to a depth of not less than 12 inches, and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should be raked over smoothly so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days; thin out so as to leave the plants (if in the border) at least 4 to 6 inches apart.

Farm Notes for June.

Field.—Winter has set in, and frosts will already have been experienced in some of the more exposed districts of the Maranoa and Darling Downs. Hence insect pests will to a great extent cease from troubling, and weeds will also be no serious drawback to cultivation. Wheat sowing should now be in full swing, and in connection with this important operation should be emphasised the necessity of at all times treating seed wheat by means of fungicides prior to sowing. Full directions for "pickling" wheat by copper carbonate treatment are available on application to the Department of Agriculture, Brisbane. Land intended for the production of early summer crops may now receive its preliminary preparation, and every opportunity taken advantage of to conserve moisture in the form of rainfall where experienced; more particularly so where it is intended to plant potatoes or early maize. Where frosts are not to be feared the planting of potatoes may take place in mid-July; but August is the recognised month for this operation. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them under cover and in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sandpit. Before pitting, spread the tubers out in a dry barn, or in the open if the weather be fine. In pitting them or storing them in hills, lay them on a thick layer of sand; then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them; then put down another layer of tubers, and repeat the process until the hill is of the requisite size, and finally cover with either straw or fresh hay. The sand excludes the air, and the potatoes will keep right through the winter. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas.

Cotton crops are now fast approaching the final stage of harvesting. Growers are advised that all bales and bags should be legibly branded with the owners' initials. In this matter the consignor is usually most careless, causing much delay and trouble in identifying parcels, which are frequently received minus address labels.

Orchard Notes for June.

THE COASTAL DISTRICTS.

The remarks that have appeared in these notes for the past two months apply in a great measure to June as well, as the advice that has been given regarding the handling, grading, packing, and marketing of the citrus crop still holds good. As the weather gets cooler the losses due to the ravages of fruit flies decrease, as these insects cannot stand cold weather, and consequently there is only an odd one about. The absence of flies does not, however, permit of any relaxation in the care that must be taken with the fruit, even though there may be many less injured fruit, owing to the absence of fruit-fly puncture, as there is always a percentage of damaged fruit which is liable to speck, which must be picked out from all consignments before they are sent to the Southern States if a satisfactory return is to be expected. If the weather is dry, citrus orchards must be kept in a good state of tilth, otherwise the trees may get a setback. Old worn-out trees can be dug out and burnt; be sure, however, to see that they *are* worn out, as many an old and apparently useless tree can be brought round and made to bear good crops, provided the trunk and main roots are still sound, even though the top of the tree is more or less dead. The whole of the top of the tree should be cut off and only the trunk and such sound main limbs left as are required to make a new head. The earth should be taken away from around the collar of the tree, and the main roots exposed, any dead roots being cut away and removed. The whole of the tree above ground and the main roots should then be dressed with a strong lime sulphur wash or Bordeaux paste. The main roots should be exposed for some time, not opened up and filled in at once. Young orchards can be set out now, provided the ground is in good order. Don't make the mistake of planting the trees in improperly prepared land—it is far better to wait till the land is ready, and you can rest assured it will pay to do so in the long run.

When planting, see that the centre of the hole is slightly higher than the sides, so that the roots, when spread out, will have a downward, not an upward, tendency; set the tree at as nearly as possible the same depth as it was when growing in the nursery, cut off all broken or bruised roots, and spread those that remain evenly, and cover them with fine top soil. If the land is dry the tree should then be given a good watering, and when the water has soaked in the hole can be filled up with dry soil. This is far better than watering the tree after the soil has been placed round it and the hole filled up. Custard apples will be ripening more slowly as the nights get colder. If the weather becomes unduly cold, or if immature fruit is sent South, the fruit is apt to turn black and be of no value. This can easily be overcome by subjecting the fruit to artificial heat, as is done in the case of bananas, during the cooler part of the year, when it will ripen up properly and develop its flavour. Grade custard apples carefully, and pack in cases holding a single layer of fruit only for the Southern markets.

Pineapples, when at all likely to be injured by frost, should be protected by a thin covering of bush hay or similar material. The plantation should be kept well worked and free from weeds, and slow-acting manure, such as bonedust or island phosphates, can be applied now. Lime can also be applied when necessary. The fruit takes longer to mature at this time of the year, consequently it can be allowed to remain on the plant till partly coloured before gathering for the Southern markets, or can be fully coloured for local use.

Banana plantations must be kept worked and free from weeds, especially if the weather is dry, as a severe check to the plants now means small fruit later on. Bananas should be allowed to become full before the fruit is cut, as they will carry all right at this time of the year; in fact, there is more danger of their being injured by cold when passing through New England by train than there is of their ripening up too quickly.

Bear in mind the advice given with regard to the handling, grading, and packing of the fruit. It will pay you to do so. Land intended for planting with bananas or pineapples during the spring should be got ready now.

Strawberries require constant attention, and, unless there is a regular and abundant rainfall, they should be watered regularly. In fact, in normal seasons an adequate supply of water is essential, as the plants soon suffer from dry weather or strong, cold westerly winds. Where not already done, vineyards should be cleaned up ready for pruning—it is, however, too early to prune or to plant out new vineyards.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

All kinds of deciduous fruit trees are now ready for pruning, and this is the principal work of the month in the orchards of the Granite Belt area. Don't be frightened to thin out young trees properly, or to cut back hard—many good trees are ruined by insufficient or bad pruning during the first three years. If you do not know how to prune, do not touch your trees, but get practical advice and instructions from one or other of the Departmental officers stationed in the district. In old orchards do not have too much bearing wood; cut out severely, especially in the case of peaches, or you are likely to get a quantity of small unsaleable fruit. There are far too many useless and unprofitable fruit trees in the Granite Belt area, which are nothing more or less than breeding-grounds for pests, such as fruit fly, and are a menace to the district. Now is the time to get rid of them. If such trees are old and worn out, take them out and burn them, but if they are still vigorous, cut all the tops off and work them over with better varieties in the coming season—apples by grafting in spring and peaches and other stone fruits by budding on to young growth in summer. Planting can start now, where the land is ready and the trees are to hand, as early planted trees become well established before spring, and thus get a good start. Be very careful what you plant. Stick to varieties of proved merit, and few at that, and give so-called novelties and inferior sorts a wide berth. Take the advice of old growers, and do not waste time experimenting with sorts that have probably been tested in the district and turned down years ago. When land is intended for planting this season, see that it is well prepared and well sweetened before the trees are put in, as young trees seldom make a good start when planted in sour and badly prepared land.

Slowly acting manures—such as bonedust, meatworks manure, or island phosphates—can be applied now, as they are not liable to be washed out of the soil, and they will be available for the use of the trees when they start growth in spring. Lime can also be applied where required. Badly drained land should be attended to, as no fruit trees will thrive with stagnant water lying round their roots.

On the Downs and Tableland all kinds of fruit trees can be pruned now, and vines can be pruned also in any district where there is no danger from late frosts, and where this can be done the prunings should be gathered and burnt, and the vineyard ploughed up and well worked to reduce the soil to a good state of tilth, so that should rain come it will absorb all that falls and the moisture can be kept in the soil by cultivation subsequently.

Citrus fruits will be at their best in the Western districts. The trees should be watered if they show signs of distress, otherwise all that is necessary is to keep the surface of the land well worked. All main-crop lemons should be cut by this time, as, if allowed to remain longer on the tree, they only become overgrown and are more suitable for the manufacture of peel, whereas if cut and cased now they will keep in good order so that they can be used during the hot weather.

THE JOURNAL APPRECIATED.

Thus a Cooroy reader (8th April, 1929):—"I have been subscribing to the Journal for eighteen months, and I assure you I greatly appreciate it."

PLATE 105.—DODGING THE BARBED WIRE.
A handy stile for getting over dividing fences.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	May, 1929.		June, 1929.		MOONRISE. May, 1929.	June, 1929.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					p.m.	a.m.
1	6.21	5.17	6.39	5.0	10.54	...
2	6.21	5.16	6.39	5 0	11.51	12.25
3	6 22	5.15	6.40	5.0		1.31
					a.m.	
4	6.23	5.14	6.40	5.0	12.49	2.31
5	6.24	5.14	6.41	5.0	1.48	3.34
6	6.24	5.13	6.41	5 0	2.47	4.42
7	6 25	5.13	6.42	5.0	3.48	5.54
8	6.25	5.12	6.42	5.0	4.50	7.5
9	6.26	5.11	6.42	5.0	5 55	8.14
10	6 26	5.11	6.42	5 0	7 8	9 18
11	6.27	5.10	6.42	5.0	8.17	10.14
12	6 27	5.10	6.43	5.0	9.27	11.1
13	6.28	5.9	6.43	5.0	10.33	11.39
					p.m.	
14	6 28	5.9	6.43	5.0	11 31	12.13
					p.m.	
15	6 29	5.8	6.43	5.0	12.23	12.44
16	6 29	5 7	6.44	5.0	1.3	1.15
17	6 30	5 7	6.44	5.0	1.40	1.44
18	6 30	5 6	6.44	5 1	2.12	2.15
19	6 31	5.6	6.45	5 1	2.42	2.51
20	6.32	5 5	6.45	5.1	3.12	3.27
21	6.33	5.5	6.45	5.1	3.43	4.10
22	6 34	5.4	6.46	5.2	4.16	4.57
23	6.34	5 4	6 46	5.2	4.52	5.49
24	6.35	5 3	6.46	5.2	5.30	6.42
25	6.35	5.3	6.46	5.3	6.14	7.36
26	6 36	5.2	6.46	5.3	7.3	8.33
27	6.36	5 2	6.46	5.3	7.54	9.28
28	6.37	5.1	6.46	5.4	8.48	10.24
29	6.37	5.1	6.46	5.4	9.42	11.20
						a m.
30	6.38	5.0	6.46	5.4	10.40	12.18
31	6.38	5.0			11.36	

Phases of the Moon, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

2 May	☽	Last Quarter	11 25 a.m.
9 ,,	●	New Moon	4 7 p.m.
16 ,,	☾	First Quarter	6 56 a.m.
23 ,,	○	Full Moon	8 49 p.m.

Perigee, 11th May, at 6.6 a.m.
Apogee, 26th May, at 5·54 p.m.

The Astronomical event of this month will be a total eclipse of the Sun, on the 9th, of unusual duration, lasting for about 5 minutes at Siam and the north end of Sumatra, to which places scientific expeditions will be sent from Europe and Australia; others may go to the Phillipine Islands. It will be invisible from the south-eastern part of Australia, but some glimpse of it as a partial eclipse will be observable in northern New South Wales, the whole of Queensland, and North Australia, also in the greater part of South and West Australia. Only a very small part of the Sun will be obscured at Brisbane, about 5 p.m., but the obscuration will be greater in the west of Queensland, where observations should be made half an hour earlier, care being taken to use deeply coloured and smoked glasses.

Jupiter will be on the far side of its orbit beyond the Sun and nearly in a line with it from the earth and therefore invisible on the 14th.

Mercury will be well situated for observation this month, being well above the horizon after sunset, especially on the 15th, being also nearly at its greatest brilliancy.

The beautiful planet Venus, after disappearing entirely from our view by the middle of April, will again grace the eastern sky before sunrise in May, growing more and more brilliant till the 26th, when it will shine almost as brightly as when in the west in March.

At 8 o'clock in the evening on May 1st Mars will be the only planet visible. It will be in Gemini somewhat low down in the north-west above Castor and Pollux and between the latter and Procyon, with the more brilliant star Sirius following Orion. Later in the month Saturn will also be an evening star. The six Zodiacal Constellations arching the sky from east to west early in the month will be: Gemini, Cancer, Leo, Virgo, Libra, and Scorpio. As the last-mentioned rises over the eastern horizon, Orion will be getting near the western. These constellations will be seen to advantage early in May.

7 June	●	New Moon	11 56 p.m.
14 ,,	☾	First Quarter	3 14 p.m.
22 ,,	○	Full Moon	2 15 p.m.
30 ,,	☽	Last Quarter	1 53 p.m.

Perigee, 8th June, at 1.30 p.m.
Apogee, 22nd June, at 10.54 p.m.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]